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No. 9: Part II

Useful Tables from the American Practical Navigator

By Nathaniel Bowditch, LL. D., etc.

PUBLISHED BY THE HYDROGRAPHIC OFFICE
UNDER THE AUTHORITY OF THE SECRETARY OF THE NAVY

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PREFACE.

The following tables comprise Part II of the AMERICAN PRACTICAL NAVIGATOR, by the late Nathaniel Bowditch, LL. D., as revised in 1880 under the direction of the Bureau of Navigation, Navy Department, and further revised in 1903 and 1910 under the direction of the Bureau of Equipment, Navy Department.

In the present edition, the former tables have been extended by incorporating Table 37A, The Equation of Equal Altitudes near Noon; Table 45, Logarithmic and Natural Haversines; Table 46, Consolidated Altitude Corrections; Table 47, The Longitude Factor; and Table 48, The Latitude Factor.

UNITED STATES HYDROGRAPHIC OFFICE,
DEPARTMENT OF THE NAVY,
Washington, D. C., August 10, 1911.

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EXPLANATION OF THE TABLES.

TABLES 1, 2: TRAVERSE TABLES.

Tables 1 and 2 were originally calculated by the natural sines taken from the fourth edition of Sherwin's Logarithms, which were previously examined, by differences; when the proof sheets of the first edition were examined the numbers were again calculated by the natural sines in the second edition of Hutton's Logarithms; and if any difference was found, the numbers were calculated a third time by Taylor's Logarithms.

The first table contains the difference of latitude and departure corresponding to distances not exceeding 300 miles, and for courses to every quarter point of the compass. Table 2 is of the same nature, but for courses consisting of whole degrees; it was originally of the same extent as Table 1, but has been extended to include distances up to 600 miles. The manner of using these tables is particularly explained under the different problems of Plane, Middle Latitude, and Mercator Sailing in Chapter V.

The tables may be employed in the solution of any right triangle.

TABLE 3: MERIDIONAL PARTS.

This table contains the meridional parts, or increased latitudes, for every degree and minute to 80°, calculated by the following formula:

$$m = \frac{a}{M} \log \tan \left(45^\circ + \frac{L}{2} \right) - a \left(e^2 \sin L + \tfrac{1}{3} e^4 \sin^3 L + \tfrac{1}{5} e^6 \sin^5 L + \quad . \quad . \quad . \quad . \quad \right),$$

in which

the Equatorial radius $a = \frac{10800'}{\pi} = 3437'.74677$ (log 3.5362739);

M, the modulus of common logarithms $= 0.4342945$;

$\frac{1}{M} = 2.3025851$ (log 0.3622157);

C, the *compression* or meridional eccentricity of the earth

according to Clarke (1880) $= \frac{1}{293.465} = 0.003407562$ (log 7.5324437);

$e = \sqrt{2c - c^2} = 0.0824846$ (log 8.9163666);

from which

$\frac{a}{M} = 7915'.7044558$ (log 3.8984895);

$ae^2 = 23'.38871$ (log 1.3690072);

$\frac{1}{3}ae^4 = 0'.053042$ (log 8.7246192);

$\frac{1}{5}ae^6 = 0'.000216523$ (log 6.3355038).

The results are tabulated to one decimal place, which is sufficient for the ordinary problems of navigation.

The practical application of this table is illustrated in Chapters II and V, in articles treating of the Mercator Chart and Mercator Sailing.

TABLE 4: LENGTH OF DEGREES OF LATITUDE AND LONGITUDE.

This table gives the length of a degree in both latitude and longitude at each parallel of latitude on the earth's surface, in nautical and statute miles and in meters, based upon Clarke's value (1866) of the earth's compression, $\frac{1}{299.15}$. In the case of latitude, the length relates to an arc of which the given degree is the center.

TABLES 5A, 5B: DISTANCE BY TWO BEARINGS.

These tables have been calculated to facilitate the operation of finding the distance from an object by two bearings from a given distance run and course. In Table 5A the arguments are given in points, in Table 5B in degrees; the first column contains the multiplier of the distance run to give the distance of observed object at second bearing; the second, at time of passing abeam.

The method is explained in article 143, Chapter IV.

TABLE 6: DISTANCE OF VISIBILITY OF OBJECTS.

This table contains the distances, in nautical and statute miles, at which any object is visible at sea. It is calculated by the formulæ:

$$d = 1.15\sqrt{x}, \text{ and } d' = 1.32\sqrt{x},$$

in which d is the distance in nautical miles, d' the distance in statute miles, and x the height of the eye or the object in feet.

To find the distance of visibility of an object, the distance given by the table corresponding to its height should be added to that corresponding to the height of the observer's eye.

Example: Required the distance of visibility of an object 420 feet high, the observer being at an elevation of 15 feet.

Dist. corresponding to 420 feet,	23.5 naut. miles.
Dist. corresponding to 15 feet,	4.4 naut. miles.
Dist. of visibility,	27.9 naut. miles.

TABLE 7: CONVERSION OF ARC AND TIME.

In the first column of each pair in this table are contained angular measures expressed in arc (degrees, minutes, or seconds), and in the second column the corresponding angles expressed in time (hours, minutes, or seconds). As will be seen from the headings of columns, the time corresponding to degrees (°) is given in hours and minutes; to minutes of arc (′), in minutes and seconds of time; and to seconds of arc (″), in seconds and sixtieths of a second of time.

The table will be especially convenient in dealing with longitude and hour angle. The method of its employment is best illustrated by examples.

Example I.

Required the time corresponding to 50° 31′ 21″.

50°	$00'$	$00''$	=	3^h	20^m	00^s
	31	00	=		2	04
		21	=			$1\frac{24}{60}$
50	31	21	=	3	22	05.4

Example II.

Required the arc corresponding to $6^h\ 33^m\ 26^s.5$.

6^h	32^m	00^s	=	98°	$00'$	$00''$
	1	24	=		21	00
		$2\frac{30}{60}$	=			37.5
6	33	26.5	=	98	21	37.5

TABLES 8 AND 9: SIDEREAL AND MEAN SOLAR TIMES.

These tables give, respectively, the reductions necessary to convert intervals of sidereal time into those of mean solar time, and intervals of mean solar into those of sidereal time. The reduction for any interval is found by entering with the number of hours at the top and the number of minutes at the side, adding the reduction for seconds as given in the margin.

The relations between mean solar and sidereal time intervals, and the methods of conversion of these times, are given in articles 289–291, Chapter IX.

TABLE 10: SUN'S RISING AND SETTING.

This table gives the local mean time of the sun's visible rising and setting—that is, of the appearance and disappearance of the sun's upper limb in the unobstructed horizon of a person whose eye is 15 feet above the level of the earth's surface, the atmospheric conditions being normal.

The local apparent times of rising and setting were determined from the formula for a time sight, the altitude employed being −0° 56′ 08″, made up of the following terms: Refraction, −36′ 29″; semi-diameter, −16′ 00″; dip, −3′ 48″; and parallax, +9″.

To ascertain the time of rising or setting for any given date and place, enter the table with the latitude and declination, interpolating if the degrees are not even. In the line R will be found the time of rising; in the line S, the time of setting. Be careful to choose the page in which the latitude is of the correct name, and in which the "approximate date" corresponds, nearly or exactly, with the given date.

This table is computed with the intention that, if accuracy is desired, it will be entered with the declination as an argument—not the date—as it is impossible to construct any table based upon dates whose application shall be general to all years. But as a given degree of declination will, in the majority of years, fall upon the date given in the table as the "approximate date," and as, when it does not do so, it can never be more than one day removed therefrom, it will answer, where a slight inaccuracy may be admitted, to enter the table with the date as an argument, thus avoiding the necessity of ascertaining the declination.

Example: Find the local mean time of sunset at Rio de Janeiro, Brazil (lat. 22° 54′ S., long. 43° 10′ W.), on January 1, 1903 (dec. 23° 04′ S.).

Exact method.

Lat. 22° Dec. 23°	$6^h\ 48^m$
Corr. for + 54′ lat	+02
Corr. for + 04′ dec.	00
L. M. T. sunset	6 50

Approximate method.

Lat. 22° January 2	$6^h\ 48^m$
Corr. for + 54′ lat.	+02
Corr. for 1 day	−01
L. M. T. sunset	6 49

TABLE 11: REDUCTION FOR MOON'S TRANSIT.

This table was calculated by proportioning the daily variation of the time of the moon's passing the meridian.

The numbers taken from the table are to be added to the Greenwich time of moon's transit in west longitude, but subtracted in east longitude.

TABLE 12: REDUCTIONS FOR NAUTICAL ALMANAC.

This is a table of proportional parts for finding the variation of the sun's right ascension or declination, or of the equation of time, in any number of minutes of time, the horary motion being given at the top of the page in seconds, and the number of minutes of time in the side column; also for finding the variation of the moon's declination or right ascension in any number of seconds of time, the motion in one minute being given at the top, and the numbers in the side column being taken for seconds.

TABLE 13: CHANGE OF SUN'S RIGHT ASCENSION.

This is a table that may be employed for finding the change of the sun's right ascension for any given number of hours, the hourly change, as taken from the Nautical Almanac, being given in the marginal columns.

TABLE 14: DIP OF SEA HORIZON.

This table contains the dip of the sea horizon, calculated by the formula:

$$D = 58''.8 \sqrt{F},$$

in which F = height of the eye above the level of the sea in feet.

It is explained in article 300, Chapter X.

TABLE 15: DIP SHORT OF HORIZON.

This table contains the dip for various distances and heights, calculated by the formula:

$$D = \frac{3}{7} d + 0.56514 \times \frac{h}{d},$$

in which D represents the dip in miles or minutes, d, the distance of the land in sea miles, and h, the height of the eye of the observer in feet.

TABLE 16: PARALLAX OF SUN.

This table contains the sun's parallax in altitude calculated by the formula:

$$\text{par.} = \sin z \times 8''.75,$$

in which z = apparent zenith distance, the sun's horizontal parallax being $8''.75$.

It is explained in article 304, Chapter X.

TABLE 17: PARALLAX OF PLANET.

Parallax in altitude of a planet is found by entering at the top with the planet's horizontal parallax, and at the side with the altitude.

TABLE 18: AUGMENTATION OF MOON'S SEMIDIAMETER.

This table gives the augmentation of the moon's semidiameter calculated by the formula:

$$x = c\, s^2 \sin h + \tfrac{1}{2} c^2 s^3 \sin^2 h + \tfrac{1}{2} c^2 s^3,$$

where h = moon's apparent altitude;
s = moon's horizontal semidiameter;
x = augmentation of semidiameter for altitude h; and
$\log c = 5.25021$.

TABLE 19: AUGMENTATION OF MOON'S HORIZONTAL PARALLAX.

This table contains the augmentation of the moon's horizontal parallax, or the correction to reduce the moon's equatorial horizontal parallax to that point of the earth's axis which lies in the vertical of the observer in any given latitude; it is computed by the formulæ:

$$\triangle \pi = \pi (b - 1), \qquad b = \frac{1}{\sqrt{(1 - e^2 \sin^2 L)}},$$

where π = equatorial horizontal parallax;
L = latitude;
e = eccentricity of the meridian; $\log e^2 = 7.81602$; and
$\triangle \pi$ = augmentation of the horizontal parallax for the latitude L.

TABLE 20A: MEAN REFRACTION.

This table gives the refraction, reduced from Bessel's tables, for a mean atmospheric condition in which the barometer is 30.00 inches, and thermometer 50° Fahr.

TABLE 20B: MEAN REFRACTION AND PARALLAX OF SUN.

This table contains the correction to be applied to the sun's apparent altitude for mean refraction and parallax, being a combination of the quantities for the altitudes given in Tables 16 and 20A.

TABLES 21, 22: CORRECTIONS OF REFRACTION FOR BAROMETER AND THERMOMETER.

These are deduced from Bessel's tables. The method of their employment will be evident.

TABLE 23: MEAN REFRACTION AND MEAN PARALLAX OF MOON.

This table contains the correction of the moon's altitude for refraction and parallax corresponding to the mean refraction (Table 20A), and a horizontal parallax of the mean value of 57′ 30″.

TABLE 24: MEAN REFRACTION AND PARALLAX OF MOON.

This table contains the correction to be applied to the moon's apparent altitude for each minute of horizontal parallax, and for every 10′ of altitude from 5°, with height of barometer 30.00 inches, and thermometer 50° Fahr.

For seconds of parallax, enter the table abreast the approximate correction and find the seconds of horizontal parallax, the tens of seconds at the side and the units at the top. Under the latter and opposite the former will be the seconds to add to the correction.

For minutes of altitude, take the seconds from the extreme right of the page, and apply them as there directed.

TABLE 25: CHANGE OF ALTITUDE DUE TO CHANGE OF DECLINATION.

This table gives the variation of the altitude of any heavenly body arising from a change of 100″ in the declination. It is useful for finding the equation of equal altitudes by the approximate method explained in article 324, Chapter XI, and for other purposes.

If the change move the body toward the elevated pole, apply the correction to the altitude with the signs in the table; otherwise change the signs.

TABLE 26: CHANGE OF ALTITUDE IN ONE MINUTE FROM MERIDIAN.

This table gives the variation of the altitude of any heavenly body, for one minute of time from meridian passage, for latitudes up to 60°, declinations to 63°, and altitudes between 6° and 86°. It is based upon the method set forth in article 334, Chapter XII, and the values may be computed by the formula:

$$a=\frac{1''.9635 \cos L \cos d}{\sin (L-d)},$$

where a = variation of altitude in one minute from meridian,
L = latitude, and
d = declination—positive for same name and negative for opposite name to latitude at upper transit, and negative for same name at lower transit.

The limits of the table take in all values of latitude, declination, and altitude which are likely to be required. In its employment, care must be taken to enter the table at a place where the declination is appropriately named (of the same or opposite name to the latitude); it should also be noted that at the bottom of the last three pages values are given for the variation of a body at *lower* transit, which can only be observed when the declination and latitude are of the same name, and in which case the reduction to the meridian is subtractive; the limitations in this case are stated at the *foot* of the page, and apply to all values below the heavy rules.

TABLE 27: CHANGE OF ALTITUDE IN GIVEN TIME FROM MERIDIAN.

This table gives the product of the variation in altitude in one minute of a heavenly body near the meridian, by the square of the number of minutes. Values are given for every half minute between $0^m\ 30^s$ and $26^m\ 0^s$, and for all variations likely to be employed in the method of "reduction to the meridian."

The formula for computing is:

$$\text{Red.} = a \times t^2,$$

where a = variation in one minute (Table 26), and
t = number of minutes (in units and tenths) from time of meridian passage.

The table is entered in the column of the nearest interval of time from meridian, and the value taken out corrresponding to the value of a found from Table 26. The units and tenths are picked out separately and combined, each being corrected by interpolation for intermediate intervals of time.

The result is the amount to be applied to the observed altitude to reduce it to the meridian altitude, which is always to be added for upper transits and subtracted for lower.

TABLE 28, A, B, C, D: LATITUDE BY POLARIS.

The formula on which these tables are based is:

$$L = h - p \cos t + \tfrac{1}{2} p^2 \sin 1'' \sin^2 t \tan h$$
$$- \tfrac{1}{3} p^3 \sin^2 1'' \cos t \sin^2 t + \tfrac{1}{8} p^4 \sin^3 1'' \sin^4 t \tan^3 h;$$

in which

L = the latitude of the place;
h = the true altitude;
p = the polar distance; and
t = the hour angle of the star.

Table A contains for the declination 88° 48′, or $p_0 = 1° 12' = 4320''$, the *first correction*,

$$A = -p_0 \cos t - \tfrac{1}{3} p_0^3 \sin^2 1'' \cos t \sin^2 t;$$

Argument, *the hour angle of the star*, or 24^h — the hour angle.
Table B contains the *second correction*,

$$B = \tfrac{1}{2} p_0^2 \sin 1'' \sin^2 t \tan h + \tfrac{1}{8} p_0^4 \sin^3 1'' \sin^4 t \tan^3 h;$$

Arguments, *the true altitude of the star* and the *hour angle*, or 24^h — *the hour angle*. This correction is always *additive*.
Table C contains the *third correction*,

$$C = \tfrac{1}{2} (p^2 - p_0^2) \sin 1'' \sin^2 t \tan h;$$

Arguments, *B* and *the declination of the star* from 88° 47′ 20″ to 88° 49′ 20″.
Table D contains the *fourth correction*,

$$-(p - p_0) \cos t - \tfrac{1}{3} (p^3 - p_0^3) \sin^2 1'' \cos t \sin^2 t;$$

Arguments, *A and the declination of the star* from 88° 47′ 20″ to 88° 49′ 20″.
The method of employing this table is illustrated in article 341, Chapter XII.

TABLES 29, 30, 31: CONVERSION TABLES.

These are self-explanatory.

TABLE 32: TRUE FORCE AND DIRECTION OF WIND.

This table enables an observer on board of a moving vessel to determine the true force and direction of the wind from its apparent force and direction. Enter the table with the apparent direction of the wind (number of points on the bow) and force (Beaufort scale) as arguments, and pick out the direction relatively to the ship's head and the force corresponding to the known speed of the ship.

EXAMPLE: A vessel steaming SE. at a speed of 15 knots appears to have a wind blowing from three points on the starboard bow with a force of 6, Beaufort scale. What is the true direction and force?

In the column headed 3 (meaning three points on bow, apparent direction) and in the line 6 (apparent force, Beaufort scale), we find abreast 15 (knots, speed of vessel) that the true direction is 5 points on starboard bow, *i. e.*, S. by W., and true force 4.

TABLE 33: VERTICAL ANGLES.

This table gives the distance of an object of known height by the vertical angle that it subtends at the position of the observer. It was computed by the formula:

$$\tan \alpha = \frac{h}{d},$$

where α = the vertical angle;
h = the height of the observed object in feet; and
d = the distance of the object, also converted into feet.

The employment of this method of finding distance is explained in article 139, chapter IV.

TABLE 34: HORIZON ANGLES.

This shows the distance in yards corresponding to any observed angle between an object and the sea horizon beyond, the observer being at a known height.

The method of use is explained in article 139, chapter IV.

TABLE 35: SPEED TABLE.

This table shows the rate of speed, in nautical miles per hour, of a vessel which traverses a measured mile in any given number of minutes and seconds. It is entered with the number of minutes at the top and the number of seconds at the side; under one and abreast the other is the number of knots of speed.

TABLE 36: LOCAL AND STANDARD TIMES.

This table contains the reduction to be applied to the local time to obtain the corresponding time at any other meridian whose time is adopted as a standard. The results are given to the nearest minute of time only, being intended for the reduction of such approximate quantities as the time of high water or time of sunset. More exact reductions, when required, may be made by Table 7.

TABLE 37: LOGARITHMS FOR EQUAL ALTITUDE SIGHTS.

Logarithms of A and B, for computing the Equation of Equal Altitudes, are calculated by the formulæ:

$$A=\frac{E}{1800 \sin \frac{1}{2} E}, \qquad B=\frac{E}{1800 \tan \frac{1}{2} E},$$

where E in the numerator is the elapsed time in minutes, and E in the denominator the elapsed time expressed in arc.

If we put

L =latitude of the place of observation, + north, − south,
d =declination of the sun, + north, − south,
n =hourly change of declination, + north, − south,
C =correction to reduce the middle chronometer time to chronometer time of apparent noon, algebraically additive,
C' =the same for midnight,

we have

$$C = -A\,n \tan L + B\,n \tan d;$$
$$C' = A\,n \tan L + B\,n \tan d.$$

This is Chauvenet's table to aid the solution of the problem of Equal Altitudes, and is explained in article 322 and following articles, Chapter XI.

TABLE 37A: EQUATION OF EQUAL ALTITUDES NEAR NOON.

When equal altitudes of the sun are timed within about 30 minutes of noon, on azimuths not less than 15°, a fairly reliable longitude can be found by applying to the mean of the chronometer times a correction known as the Equation of Equal Altitudes near Noon. This correction depends upon the speed with which the ship and sun are nearing or parting, being + to the mean of the times of the sights when they are parting; and the table contains the factors by which the relative speed of the ship and sun must be multiplied to obtain the value of the "Equation."

Example.—At Ship Apparent Noon, Latitude was 11° 5′ N.; Declination 8° 4′ N., decreasing 55″ per hour; Equation of Time 16 sec. + to M.T. Ship was steaming N. 42° W. at 15.2 knots. Equal Altitudes were timed, and the G.M.T. for the mid-time was 1h. 19m. 30s. Required longitude at noon.

Speed of ship=d. Latitude for 15.2, N. 42° W.=11.3 knots=678″ N. per hour.
" " sun = = 55″ S. " "

Relative speed, *parting* =733″ " "
Ⓔ from Table=.054−.039 =.015
Equation of Equal Altitudes=.015×733 =11 sec. *plus* to mean.

		h.	m.	s.	
Mid-time of Sights	=	1	19	30	G.M.T.
Equation of Equal Altitudes	=			+11	
Time of Apparent Noon	=	1	19	41	G.M.T.
Equation of time				+16	
Time of Apparent Noon	=	1	19	57	G.A.T.
	=	19° 59¼′ West Longitude.			

TABLE 38: EFFECT UPON LONGITUDE OF ERROR IN LATITUDE.

Table 38 shows, approximately, the error in longitude in miles and tenths of a mile, occasioned by an error of one mile in the latitude.

Thus, when the sun's altitude is 30°, the latitude 30°, and the polar distance 100°, the error is eight-tenths of a mile.

The effect of an *increase* of latitude is as follows:

In *West* longitude, the body being $\begin{Bmatrix}\text{East}\\ \text{West}\end{Bmatrix}$ of meridian, the longitude is $\begin{Bmatrix}\text{decreased}\\ \text{increased}\end{Bmatrix}$, except where marked by *, when it is $\begin{Bmatrix}\text{increased}\\ \text{decreased}\end{Bmatrix}$.

In *East* longitude, the body being $\begin{Bmatrix}\text{East}\\ \text{West}\end{Bmatrix}$ of meridian, the longitude is $\begin{Bmatrix}\text{increased}\\ \text{decreased}\end{Bmatrix}$, except where marked by *, when it is $\begin{Bmatrix}\text{decreased}\\ \text{increased}\end{Bmatrix}$.

A *decrease* of latitude has the contrary effect.

The direction of error may readily be seen by drawing the Sumner line in a direction at right angles to the approximate bearing of the body.

TABLE 39: AMPLITUDES.

This table contains amplitudes of heavenly bodies, at rising and setting, for various latitudes and declinations, computed by the formula:

$$\sin \text{amp.} = \sec \text{Lat.} \times \sin \text{dec.}$$

It is entered with the declination at the top and the latitude at the side.

Its use is explained in article 358, Chapter XIV.

TABLE 40: CORRECTION FOR AMPLITUDES.

This table gives a correction to be applied to the observed amplitude to counteract the vertical displacement due to refraction, parallax, and dip, when the body is observed with its center in the visible horizon.

The correction is to be applied for the sun, a planet, or a star, as follows:

$\left.\begin{matrix}\text{At Rising in N. Lat.}\\ \text{Setting in S. Lat.}\end{matrix}\right\}$ apply the correction to the right.

$\left.\begin{matrix}\text{At Rising in S. Lat.}\\ \text{Setting in N. Lat.}\end{matrix}\right\}$ apply the correction to the left.

For the moon, apply *half* the correction in the *contrary* manner.

TABLE 41: NATURAL SINES AND COSINES.

This table contains the natural sine and cosine for every minute of the quadrant, and is to be entered at the top or bottom with the degrees, and at the side marked M., with the minutes; the corresponding numbers will be the natural sine and cosine, respectively, observing that if the degrees are found at the top, the name sine, cosine, and M. must also be found at the top, and the contrary if the degrees are found at the bottom. It should be understood that all numbers given in the table should be divided by 100,000—that is, pointed off to contain five decimal places. Thus, .43366 is the natural sine of 25° 42′, or the cosine of 64° 18′.

In the outer columns of the margin are given tables of proportional parts, for the purpose of finding, approximately, by inspection, the proportional part corresponding to any number of seconds in the proposed angle, the seconds being found in the marginal column marked M., and the correction in the adjoining column. Thus, if we suppose that it were required to find the natural sine corresponding to 25° 42′ 19″, the difference of the sines of 25° 42′ and 25° 43′ is 26, being the same as at the top of the left-hand column of the table; and in this column, and opposite 19 in the column M., is the correction 8. *Adding* this to the above number .43366, because the numbers are *increasing*, we get .43374 for the sine of 25° 42′ 19″. In like manner, we find the cosine of the same angle to be .90108—4=.90104, using the right-hand columns, and *subtracting* because the numbers are *decreasing;* observing, however, that the number 14 at the top of this column varies 1 from the difference between the cosines of 25° 42′ and 25° 43′, which is only 13; so that the table may give in some cases a unit too much between the angles 25° 42′ and 25° 43′; but this is, in general, of but little importance, and when accuracy is required, the usual method of proportional parts is to be resorted to, using the actual tabular difference.

TABLE 42: LOGARITHMS OF NUMBERS.

This table, containing the common logarithms of numbers, was compared with Sherwin's, Hutton's, and Taylor's logarithms; its use is explained in an article on Logarithms in Appendix III.

TABLE 43: LOGARITHMS OF TRIGONOMETRIC FUNCTIONS, QUARTER POINTS.

This table contains the logarithms of the sines, tangents, etc., corresponding to points and quarter points of the compass. This was compared with Sherwin's, Hutton's, and Taylor's logarithms.

TABLE 44: LOGARITHMS OF TRIGONOMETRIC FUNCTIONS, DEGREES.

This table contains the common logarithms of the sines, tangents, secants, etc. It was compared with Sherwin's, Hutton's, and Taylor's tables. Two additional columns are given in this table, which are very convenient in finding the time from an altitude of the sun; also, three columns of proportional parts for seconds of space, and a small table at the bottom of each page for finding the proportional parts for seconds of time. The degrees are marked to 180°, which saves the trouble of subtracting the given angle from 180° when it exceeds 90°.

The use of this table is fully explained in Appendix III in an article on Logarithms.

TABLE 45: LOGARITHMIC AND NATURAL HAVERSINES.

The haversine is defined by the following relation:

$$\text{hav. } A=\tfrac{1}{2}\text{ vers. } A=\tfrac{1}{2}(1-\cos A)=\sin^2 \tfrac{1}{2}A.$$

It is a trigonometric function which simplifies the solution of many problems in nautical astronomy as well as in plane trigonometry. To afford the maximum facility in carrying out the processes of solution, the values of the natural haversine and its logarithm are set down together in a single table for all values of angle ranging from 0° to 360°, expressed both in arc and in time.

TABLE 46: CORRECTIONS TO BE APPLIED IN ORDER TO FIND THE TRUE ALTITUDE OF A STAR AND ALSO OF THE SUN FROM THE OBSERVED ALTITUDE ABOVE THE HORIZON.

This is a consolidated table in which the tabulated correction for an observed altitude of a star combines the mean refraction and the dip, and that for an observed altitude of the sun's lower limb combines the mean refraction, the dip, the parallax, and the mean semidiameter, which is taken as 16′. A supplementary table at the foot of the main table takes account of the variation of the sun's semidiameter in the different months of the year.

TABLE 47: THE LONGITUDE FACTOR.

The change in longitude due to a change of 1′ in latitude, called the longitude factor, F, is given in this table at suitable intervals of latitude and azimuth. The quantities tabulated are computed from the formula—

$$F=\text{sec. Lat.}\times\text{cot. Az.}$$

When a time sight is solved with a dead-reckoning latitude, the resulting longitude is only true if the latitude be correct. This table, by setting forth the number of minutes of longitude due to each minute of error in latitude, gives the means of finding the correction to the longitude for any error that may subsequently be disclosed in the latitude used in the calculation.

Regarding the azimuth of the observed celestial body as less than 90° and as measured from either the North or the South point of the horizon towards East or West, the rule for determining whether the correction in longitude is to be applied to the eastward or to the westward will be as follows: If the change in latitude is of the same name as the first letter of the bearing, the change in longitude is of the contrary name to that of the second letter, and vice versa.

Thus, if the body bears S. 45° E. and the change in latitude is to the southward, the change in longitude will be to the westward; and, if the change in latitude is to the northward, the change in longitude will be to the eastward.

The convenient application of the longitude factor in finding the intersection of Sumner lines is explained in article 389.

TABLE 48: THE LATITUDE FACTOR.

The change in latitude due to a change of 1′ in the longitude, called the latitude factor, f, is given in this table at suitable intervals of latitude and azimuth. The quantities tabulated, being the reciprocals of the values of the longitude factor, are computed from the formula—

$$f=\frac{1}{F}=\frac{1}{\text{sec. Lat.}\times\text{cot. Az.}}=\text{cos. Lat.}\times\text{tan. Az.}$$

When an ex-meridian sight is solved with a longitude afterwards found to be in error, this table, by setting forth the number of minutes of latitude due to each 1′ of error in longitude, gives the means of finding the correction in the latitude for the amount of error in the longitude used in the calculation.

Regarding the azimuth of the observed celestial body as less than 90° and as measured from either the North or the South point of the horizon towards East or West, the rule for determining whether the correction in latitude is to be applied to the northward or to the southward is as follows: If the change in longitude is of the same name as the second letter of the bearing, the change in latitude is of the contrary name to the first letter, and vice versa. Thus, if the body bears S. 14° E. and the change in longitude is to the westward, the change in latitude will be to the southward, and, if the change in longitude is to the eastward, the change in latitude will be to the northward.

The convenient application of the latitude factor in finding the intersection of Sumner lines is explained in article 390.

TABLE 1.

Difference of Latitude and Departure for ¼ Point.

N. ¼ E. N. ¼ W. S. ¼ E. S. ¼ W.

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.0	61	60.9	3.0	121	120.9	5.9	181	180.8	8.9	241	240.7	11.8
2	2.0	0.1	62	61.9	3.0	22	121.9	6.0	82	181.8	8.9	42	241.7	11.9
3	3.0	0.1	63	62.9	3.1	23	122.9	6.0	83	182.8	9.0	43	242.7	11.9
4	4.0	0.2	64	63.9	3.1	24	123.9	6.1	84	183.8	9.0	44	243.7	12.0
5	5.0	0.2	65	64.9	3.2	25	124.8	6.1	85	184.8	9.1	45	244.7	12.0
6	6.0	0.3	66	65.9	3.2	26	125.8	6.2	86	185.8	9.1	46	245.7	12.1
7	7.0	0.3	67	66.9	3.3	27	126.8	6.2	87	186.8	9.2	47	246.7	12.1
8	8.0	0.4	68	67.9	3.3	28	127.8	6.3	88	187.8	9.2	48	247.7	12.2
9	9.0	0.4	69	68.9	3.4	29	128.8	6.3	89	188.8	9.3	49	248.7	12.2
10	10.0	0.5	70	69.9	3.4	30	129.8	6.4	90	189.8	9.3	50	249.7	12.3
11	11.0	0.5	71	70.9	3.5	131	130.8	6.4	191	190.8	9.4	251	250.7	12.3
12	12.0	0.6	72	71.9	3.5	32	131.8	6.5	92	191.8	9.4	52	251.7	12.4
13	13.0	0.6	73	72.9	3.6	33	132.8	6.5	93	192.8	9.5	53	252.7	12.4
14	14.0	0.7	74	73.9	3.6	34	133.8	6.6	94	193.8	9.5	54	253.7	12.5
15	15.0	0.7	75	74.9	3.7	35	134.8	6.6	95	194.8	9.6	55	254.7	12.5
16	16.0	0.8	76	75.9	3.7	36	135.8	6.7	96	195.8	9.6	56	255.7	12.6
17	17.0	0.8	77	76.9	3.8	37	136.8	6.7	97	196.8	9.7	57	256.7	12.6
18	18.0	0.9	78	77.9	3.8	38	137.8	6.8	98	197.8	9.7	58	257.7	12.7
19	19.0	0.9	79	78.9	3.9	39	138.8	6.8	99	198.8	9.8	59	258.7	12.7
20	20.0	1.0	80	79.9	3.9	40	139.8	6.9	200	199.8	9.8	60	259.7	12.8
21	21.0	1.0	81	80.9	4.0	141	140.8	6.9	201	200.8	9.9	261	260.7	12.8
22	22.0	1.1	82	81.9	4.0	42	141.8	7.0	02	201.8	9.9	62	261.7	12.9
23	23.0	1.1	83	82.9	4.1	43	142.8	7.0	03	202.8	10.0	63	262.7	12.9
24	24.0	1.2	84	83.9	4.1	44	143.8	7.1	04	203.8	10.0	64	263.7	13.0
25	25.0	1.2	85	84.9	4.2	45	144.8	7.1	05	204.8	10.1	65	264.7	13.0
26	26.0	1.3	86	85.9	4.2	46	145.8	7.2	06	205.8	10.1	66	265.7	13.1
27	27.0	1.3	87	86.9	4.3	47	146.8	7.2	07	206.8	10.2	67	266.7	13.1
28	28.0	1.4	88	87.9	4.3	48	147.8	7.3	08	207.7	10.2	68	267.7	13.2
29	29.0	1.4	89	88.9	4.4	49	148.8	7.3	09	208.7	10.3	69	268.7	13.2
30	30.0	1.5	90	89.9	4.4	50	149.8	7.4	10	209.7	10.3	70	269.7	13.2
31	31.0	1.5	91	90.9	4.5	151	150.8	7.4	211	210.7	10.4	271	270.7	13.3
32	32.0	1.6	92	91.9	4.5	52	151.8	7.5	12	211.7	10.4	72	271.7	13.3
33	33.0	1.6	93	92.9	4.6	53	152.8	7.5	13	212.7	10.5	73	272.7	13.4
34	34.0	1.7	94	93.9	4.6	54	153.8	7.6	14	213.7	10.5	74	273.7	13.4
35	35.0	1.7	95	94.9	4.7	55	154.8	7.6	15	214.7	10.5	75	274.7	13.5
36	36.0	1.8	96	95.9	4.7	56	155.8	7.7	16	215.7	10.6	76	275.7	13.5
37	37.0	1.8	97	96.9	4.8	57	156.8	7.7	17	216.7	10.6	77	276.7	13.6
38	38.0	1.9	98	97.9	4.8	58	157.8	7.8	18	217.7	10.7	78	277.7	13.6
39	39.0	1.9	99	98.9	4.9	59	158.8	7.8	19	218.7	10.7	79	278.7	13.7
40	40.0	2.0	100	99.9	4.9	60	159.8	7.9	20	219.7	10.8	80	279.7	13.7
41	41.0	2.0	101	100.9	5.0	161	160.8	7.9	221	220.7	10.8	281	280.7	13.8
42	41.9	2.1	02	101.9	5.0	62	161.8	7.9	22	221.7	10.9	82	281.7	13.8
43	42.9	2.1	03	102.9	5.1	63	162.8	8.0	23	222.7	10.9	83	282.7	13.9
44	43.9	2.2	04	103.9	5.1	64	163.8	8.0	24	223.7	11.0	84	283.7	13.9
45	44.9	2.2	05	104.9	5.2	65	164.8	8.1	25	224.7	11.0	85	284.7	14.0
46	45.9	2.3	06	105.9	5.2	66	165.8	8.1	26	225.7	11.1	86	285.7	14.0
47	46.9	2.3	07	106.9	5.3	67	166.8	8.2	27	226.7	11.1	87	286.7	14.1
48	47.9	2.4	08	107.9	5.3	68	167.8	8.2	28	227.7	11.2	88	287.7	14.1
49	48.9	2.4	09	108.9	5.3	69	168.8	8.3	29	228.7	11.2	89	288.7	14.2
50	49.9	2.5	10	109.9	5.4	70	169.8	8.3	30	229.7	11.3	90	289.7	14.2
51	50.9	2.5	111	110.9	5.4	171	170.8	8.4	231	230.7	11.3	291	290.6	14.3
52	51.9	2.6	12	111.9	5.5	72	171.8	8.4	32	231.7	11.4	92	291.6	14.3
53	52.9	2.6	13	112.9	5.5	73	172.8	8.5	33	232.7	11.4	93	292.6	14.4
54	53.9	2.6	14	113.9	5.6	74	173.8	8.5	34	233.7	11.5	94	293.6	14.4
55	54.9	2.7	15	114.9	5.6	75	174.8	8.6	35	234.7	11.5	95	294.6	14.5
56	55.9	2.7	16	115.9	5.7	76	175.8	8.6	36	235.7	11.6	96	295.6	14.5
57	56.9	2.8	17	116.9	5.7	77	176.8	8.7	37	236.7	11.6	97	296.6	14.6
58	57.9	2.8	18	117.9	5.8	78	177.8	8.7	38	237.7	11.7	98	297.6	14.6
59	58.9	2.9	19	118.9	5.8	79	178.8	8.8	39	238.7	11.7	99	298.6	14.7
60	59.9	2.9	20	119.9	5.9	80	179.8	8.8	40	239.7	11.8	300	299.6	14.7
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

E. ¼ N. E. ¼ S. W. ¼ N. W. ¼ S. [For 7¾ Points.

TABLE 1.

Difference of Latitude and Departure for ½ Point.

N. ½ E. N. ½ W. S. ½ E. S. ½ W.

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.1	61	60.7	6.0	121	120.4	11.9	181	180.1	17.7	241	239.8	23.6
2	2.0	0.2	62	61.7	6.1	22	121.4	12.0	82	181.1	17.8	42	240.8	23.7
3	3.0	0.3	63	62.7	6.2	23	122.4	12.1	83	182.1	17.9	43	241.8	23.8
4	4.0	0.4	64	63.7	6.3	24	123.4	12.2	84	183.1	18.0	44	242.8	23.9
5	5.0	0.5	65	64.7	6.4	25	124.4	12.3	85	184.1	18.1	45	243.8	24.0
6	6.0	0.6	66	65.7	6.5	26	125.4	12.4	86	185.1	18.2	46	244.8	24.1
7	7.0	0.7	67	66.7	6.6	27	126.4	12.4	87	186.1	18.3	47	245.8	24.2
8	8.0	0.8	68	67.7	6.7	28	127.4	12.5	88	187.1	18.4	48	246.8	24.3
9	9.0	0.9	69	68.7	6.8	29	128.4	12.6	89	188.1	18.5	49	247.8	24.4
10	10.0	1.0	70	69.7	6.9	30	129.4	12.7	90	189.1	18.6	50	248.8	24.5
11	10.9	1.1	71	70.7	7.0	131	130.4	12.8	191	190.1	18.7	251	249.8	24.6
12	11.9	1.2	72	71.7	7.1	32	131.4	12.9	92	191.1	18.8	52	250.8	24.7
13	12.9	1.3	73	72.6	7.2	33	132.4	13.0	93	192.1	18.9	53	251.8	24.8
14	13.9	1.4	74	73.6	7.3	34	133.4	13.1	94	193.1	19.0	54	252.8	24.9
15	14.9	1.5	75	74.6	7.4	35	134.3	13.2	95	194.1	19.1	55	253.8	25.0
16	15.9	1.6	76	75.6	7.4	36	135.3	13.3	96	195.1	19.2	56	254.8	25.1
17	16.9	1.7	77	76.6	7.5	37	136.3	13.4	97	196.1	19.3	57	255.8	25.2
18	17.9	1.8	78	77.6	7.6	38	137.3	13.5	98	197.0	19.4	58	256.8	25.3
19	18.9	1.9	79	78.6	7.7	39	138.3	13.6	99	198.0	19.5	59	257.8	25.4
20	19.9	2.0	80	79.6	7.8	40	139.3	13.7	200	199.0	19.6	60	258.7	25.5
21	20.9	2.1	81	80.6	7.9	141	140.3	13.8	201	200.0	19.7	261	259.7	25.6
22	21.9	2.2	82	81.6	8.0	42	141.3	13.9	02	201.0	19.8	62	260.7	25.7
23	22.9	2.3	83	82.6	8.1	43	142.3	14.0	03	202.0	19.9	63	261.7	25.8
24	23.9	2.4	84	83.6	8.2	44	143.3	14.1	04	203.0	20.0	64	262.7	25.9
25	24.9	2.5	85	84.6	8.3	45	144.3	14.2	05	204.0	20.1	65	263.7	26.0
26	25.9	2.5	86	85.6	8.4	46	145.3	14.3	06	205.0	20.2	66	264.7	26.1
27	26.9	2.6	87	86.6	8.5	47	146.3	14.4	07	206.0	20.3	67	265.7	26.2
28	27.9	2.7	88	87.6	8.6	48	147.3	14.5	08	207.0	20.4	68	266.7	26.3
29	28.9	2.8	89	88.6	8.7	49	148.3	14.6	09	208.0	20.5	69	267.7	26.4
30	29.9	2.9	90	89.6	8.8	50	149.3	14.7	10	209.0	20.6	70	268.7	26.5
31	30.9	3.0	91	90.6	8.9	151	150.3	14.8	211	210.0	20.7	271	269.7	26.6
32	31.8	3.1	92	91.6	9.0	52	151.3	14.9	12	211.0	20.8	72	270.7	26.7
33	32.8	3.2	93	92.6	9.1	53	152.3	15.0	13	212.0	20.9	73	271.7	26.8
34	33.8	3.3	94	93.5	9.2	54	153.3	15.1	14	213.0	21.0	74	272.7	26.9
35	34.8	3.4	95	94.5	9.3	55	154.3	15.2	15	214.0	21.1	75	273.7	27.0
36	35.8	3.5	96	95.5	9.4	56	155.2	15.3	16	215.0	21.2	76	274.7	27.1
37	36.8	3.6	97	96.5	9.5	57	156.2	15.4	17	216.0	21.3	77	275.7	27.2
38	37.8	3.7	98	97.5	9.6	58	157.2	15.5	18	217.0	21.4	78	276.7	27.2
39	38.8	3.8	99	98.5	9.7	59	158.2	15.6	19	217.9	21.5	79	277.7	27.3
40	39.8	3.9	100	99.5	9.8	60	159.2	15.7	20	218.9	21.6	80	278.7	27.4
41	40.8	4.0	101	100.5	9.9	161	160.2	15.8	221	219.9	21.7	281	279.6	27.5
42	41.8	4.1	02	101.5	10.0	62	161.2	15.9	22	220.9	21.8	82	280.6	27.6
43	42.8	4.2	03	102.5	10.1	63	162.2	16.0	23	221.9	21.9	83	281.6	27.7
44	43.8	4.3	04	103.5	10.2	64	163.2	16.1	24	222.9	22.0	84	282.6	27.8
45	44.8	4.4	05	104.5	10.3	65	164.2	16.2	25	223.9	22.1	85	283.6	27.9
46	45.8	4.5	06	105.5	10.4	66	165.2	16.3	26	224.9	22.2	86	284.6	28.0
47	46.8	4.6	07	106.5	10.5	67	166.2	16.4	27	225.9	22.2	87	285.6	28.1
48	47.8	4.7	08	107.5	10.6	68	167.2	16.5	28	226.9	22.3	88	286.6	28.2
49	48.8	4.8	09	108.5	10.7	69	168.2	16.6	29	227.9	22.4	89	287.6	28.3
50	49.8	4.9	10	109.5	10.8	70	169.2	16.7	30	228.9	22.5	90	288.6	28.4
51	50.8	5.0	111	110.5	10.9	171	170.2	16.8	231	229.9	22.6	291	289.6	28.5
52	51.7	5.1	12	111.5	11.0	72	171.2	16.9	32	230.9	22.7	92	290.6	28.6
53	52.7	5.2	13	112.5	11.1	73	172.2	17.0	33	231.9	22.8	93	291.6	28.7
54	53.7	5.3	14	113.5	11.2	74	173.2	17.1	34	232.9	22.9	94	292.6	28.8
55	54.7	5.4	15	114.4	11.3	75	174.2	17.2	35	233.9	23.0	95	293.6	28.9
56	55.7	5.5	16	115.4	11.4	76	175.2	17.3	36	234.9	23.1	96	294.6	29.0
57	56.7	5.6	17	116.4	11.5	77	176.1	17.3	37	235.9	23.2	97	295.6	29.1
58	57.7	5.7	18	117.4	11.6	78	177.1	17.4	38	236.9	23.3	98	296.6	29.2
59	58.7	5.8	19	118.4	11.7	79	178.1	17.5	39	237.8	23.4	99	297.6	29.3
60	59.7	5.9	20	119.4	11.8	80	179.1	17.6	40	238.8	23.5	300	298.6	29.4
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

E. ½ N. E. ½ S. W. ½ N. W ½ S. [For 7½ Points.

TABLE 1.

Difference of Latitude and Departure for ¾ Point.

N. ¾ E.			N. ¾ W.			S. ¾ E.			S. ¾ W.					
Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.1	61	60.3	9.0	121	119.7	17.8	181	179.0	26.6	241	238.4	35.4
2	2.0	0.3	62	61.3	9.1	22	120.7	17.9	82	180.0	26.7	42	239.4	35.5
3	3.0	0.4	63	62.3	9.2	23	121.7	18.0	83	181.0	26.9	43	240.4	35.7
4	4.0	0.6	64	63.3	9.4	24	122.7	18.2	84	182.0	27.0	44	241.4	35.8
5	4.9	0.7	65	64.3	9.5	25	123.6	18.3	85	183.0	27.1	45	242.3	35.9
6	5.9	0.9	66	65.3	9.7	26	124.6	18.5	86	184.0	27.3	46	243.3	36.1
7	6.9	1.0	67	66.3	9.8	27	125.6	18.6	87	185.0	27.4	47	244.3	36.2
8	7.9	1.2	68	67.3	10.0	28	126.6	18.8	88	186.0	27.6	48	245.3	36.4
9	8.9	1.3	69	68.3	10.1	29	127.6	18.9	89	187.0	27.7	49	246.3	36.5
10	9.9	1.5	70	69.2	10.3	30	128.6	19.1	90	187.9	27.9	50	247.3	36.7
11	10.9	1.6	71	70.2	10.4	131	129.6	19.2	191	188.9	28.0	251	248.3	36.8
12	11.9	1.8	72	71.2	10.6	32	130.6	19.4	92	189.9	28.2	52	249.3	37.0
13	12.9	1.9	73	72.2	10.7	33	131.6	19.5	93	190.9	28.3	53	250.3	37.1
14	13.8	2.1	74	73.2	10.9	34	132.5	19.7	94	191.9	28.5	54	251.3	37.3
15	14.8	2.2	75	74.2	11.0	35	133.5	19.8	95	192.9	28.6	55	252.2	37.4
16	15.8	2.3	76	75.2	11.2	36	134.5	20.0	96	193.9	28.8	56	253.2	37.6
17	16.8	2.5	77	76.2	11.3	37	135.5	20.1	97	194.9	28.9	57	254.2	37.7
18	17.8	2.6	78	77.2	11.4	38	136.5	20.2	98	195.9	29.1	58	255.2	37.9
19	18.8	2.8	79	78.1	11.6	39	137.5	20.4	99	196.8	29.2	59	256.2	38.0
20	19.8	2.9	80	79.1	11.7	40	138.5	20.5	200	197.8	29.3	60	257.2	38.1
21	20.8	3.1	81	80.1	11.9	141	139.5	20.7	201	198.8	29.5	261	258.2	38.3
22	21.8	3.2	82	81.1	12.0	42	140.5	20.8	02	199.8	29.6	62	259.2	38.4
23	22.8	3.4	83	82.1	12.2	43	141.5	21.0	03	200.8	29.8	63	260.2	38.6
24	23.7	3.5	84	83.1	12.3	44	142.4	21.1	04	201.8	29.9	64	261.1	38.7
25	24.7	3.7	85	84.1	12.5	45	143.4	21.3	05	202.8	30.1	65	262.1	38.9
26	25.7	3.8	86	85.1	12.6	46	144.4	21.4	06	203.8	30.2	66	263.1	39.0
27	26.7	4.0	87	86.1	12.8	47	145.4	21.6	07	204.8	30.4	67	264.1	39.2
28	27.7	4.1	88	87.0	12.9	48	146.4	21.7	08	205.7	30.5	68	265.1	39.3
29	28.7	4.3	89	88.0	13.1	49	147.4	21.9	09	206.7	30.7	69	266.1	39.5
30	29.7	4.4	90	89.0	13.2	50	148.4	22.0	10	207.7	30.8	70	267.1	39.6
31	30.7	4.5	91	90.0	13.4	151	149.4	22.2	211	208.7	31.0	271	268.1	39.8
32	31.7	4.7	92	91.0	13.5	52	150.4	22.3	12	209.7	31.1	72	269.1	39.9
33	32.6	4.8	93	92.0	13.6	53	151.3	22.4	13	210.7	31.3	73	270.0	40.1
34	33.6	5.0	94	93.0	13.8	54	152.3	22.6	14	211.7	31.4	74	271.0	40.2
35	34.6	5.1	95	94.0	13.9	55	153.3	22.7	15	212.7	31.5	75	272.0	40.4
36	35.6	5.3	96	95.0	14.1	56	154.3	22.9	16	213.7	31.7	76	273.0	40.5
37	36.6	5.4	97	96.0	14.2	57	155.3	23.0	17	214.7	31.8	77	274.0	40.6
38	37.6	5.6	98	96.9	14.4	58	156.3	23.2	18	215.6	32.0	78	275.0	40.8
39	38.6	5.7	99	97.9	14.5	59	157.3	23.3	19	216.6	32.1	79	276.0	40.9
40	39.6	5.9	100	98.9	14.7	60	158.3	23.5	20	217.6	32.3	80	277.0	41.1
41	40.6	6.0	101	99.9	14.8	161	159.3	23.6	221	218.6	32.4	281	278.0	41.2
42	41.5	6.2	02	100.9	15.0	62	160.2	23.8	22	219.6	32.6	82	278.9	41.4
43	42.5	6.3	03	101.9	15.1	63	161.2	23.9	23	220.6	32.7	83	279.9	41.5
44	43.5	6.5	04	102.9	15.3	64	162.2	24.1	24	221.6	32.9	84	280.9	41.7
45	44.5	6.6	05	103.9	15.4	65	163.2	24.2	25	222.6	33.0	85	281.9	41.8
46	45.5	6.7	06	104.9	15.6	66	164.2	24.4	26	223.6	33.2	86	282.9	42.0
47	46.5	6.9	07	105.8	15.7	67	165.2	24.5	27	224.5	33.3	87	283.9	42.1
48	47.5	7.0	08	106.8	15.8	68	166.2	24.7	28	225.5	33.5	88	284.9	42.3
49	48.5	7.2	09	107.8	16.0	69	167.2	24.8	29	226.5	33.6	89	285.9	42.4
50	49.5	7.3	10	108.8	16.1	70	168.2	24.9	30	227.5	33.7	90	286.9	42.6
51	50.4	7.5	111	109.8	16.3	171	169.1	25.1	231	228.5	33.9	291	287.9	42.7
52	51.4	7.6	12	110.8	16.4	72	170.1	25.2	32	229.5	34.0	92	288.8	42.8
53	52.4	7.8	13	111.8	16.6	73	171.1	25.4	33	230.5	34.2	93	289.8	43.0
54	53.4	7.9	14	112.8	16.7	74	172.1	25.5	34	231.5	34.3	94	290.8	43.1
55	54.4	8.1	15	113.8	16.9	75	173.1	25.7	35	232.5	34.5	95	291.8	43.3
56	55.4	8.2	16	114.7	17.0	76	174.1	25.8	36	233.4	34.6	96	292.8	43.4
57	56.4	8.4	17	115.7	17.2	77	175.1	26.0	37	234.4	34.8	97	293.8	43.6
58	57.4	8.5	18	116.7	17.3	78	176.1	26.1	38	235.4	34.9	98	294.8	43.7
59	58.4	8.7	19	117.7	17.5	79	177.1	26.3	39	236.4	35.1	99	295.8	43.9
60	59.4	8.8	20	118.7	17.6	80	178.1	26.4	40	237.4	35.2	300	296.8	44.0
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.
E. ¾ N.			E. ¾ S.			W. ¾ N.			W. ¾ S.			[For 7¼ Points.		

TABLE 1.

Difference of Latitude and Departure for 1 Point.

N. by E. N. by W. S. by E. S. by W.

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.2	61	59.8	11.9	121	118.7	23.6	181	177.5	35.3	241	236.4	47.0
2	2.0	0.4	62	60.8	12.1	22	119.7	23.8	82	178.5	35.5	42	237.4	47.2
3	2.9	0.6	63	61.8	12.3	23	120.6	24.0	83	179.5	35.7	43	238.3	47.4
4	3.9	0.8	64	62.8	12.5	24	121.6	24.2	84	180.5	35.9	44	239.3	47.6
5	4.9	1.0	65	63.8	12.7	25	122.6	24.4	85	181.4	36.1	45	240.3	47.8
6	5.9	1.2	66	64.7	12.9	26	123.6	24.6	86	182.4	36.3	46	241.3	48.0
7	6.9	1.4	67	65.7	13.1	27	124.6	24.8	87	183.4	36.5	47	242.3	48.2
8	7.8	1.6	68	66.7	13.3	28	125.5	25.0	88	184.4	36.7	48	243.2	48.4
9	8.8	1.8	69	67.7	13.5	29	126.5	25.2	89	185.4	36.9	49	244.2	48.6
10	9.8	2.0	70	68.7	13.7	30	127.5	25.4	90	186.3	37.1	50	245.2	48.8
11	10.8	2.1	71	69.6	13.9	131	128.5	25.6	191	187.3	37.3	251	246.2	49.0
12	11.8	2.3	72	70.6	14.0	32	129.5	25.8	92	188.3	37.5	52	247.2	49.2
13	12.8	2.5	73	71.6	14.2	33	130.4	25.9	93	189.3	37.7	53	248.1	49.4
14	13.7	2.7	74	72.6	14.4	34	131.4	26.1	94	190.3	37.8	54	249.1	49.6
15	14.7	2.9	75	73.6	14.6	35	132.4	26.3	95	191.3	38.0	55	250.1	49.7
16	15.7	3.1	76	74.5	14.8	36	133.4	26.5	96	192.2	38.2	56	251.1	49.9
17	16.7	3.3	77	75.5	15.0	37	134.4	26.7	97	193.2	38.4	57	252.1	50.1
18	17.7	3.5	78	76.5	15.2	38	135.3	26.9	98	194.2	38.6	58	253.0	50.3
19	18.6	3.7	79	77.5	15.4	39	136.3	27.1	99	195.2	38.8	59	254.0	50.5
20	19.6	3.9	80	78.5	15.6	40	137.3	27.3	200	196.2	39.0	60	255.0	50.7
21	20.6	4.1	81	79.4	15.8	141	138.3	27.5	201	197.1	39.2	261	256.0	50.9
22	21.6	4.3	82	80.4	16.0	42	139.3	27.7	02	198.1	39.4	62	257.0	51.1
23	22.6	4.5	83	81.4	16.2	43	140.3	27.9	03	199.1	39.6	63	257.9	51.3
24	23.5	4.7	84	82.4	16.4	44	141.2	28.1	04	200.1	39.8	64	258.9	51.5
25	24.5	4.9	85	83.4	16.6	45	142.2	28.3	05	201.1	40.0	65	259.9	51.7
26	25.5	5.1	86	84.3	16.8	46	143.2	28.5	06	202.0	40.2	66	260.9	51.9
27	26.5	5.3	87	85.3	17.0	47	144.2	28.7	07	203.0	40.4	67	261.9	52.1
28	27.5	5.5	88	86.3	17.2	48	145.2	28.9	08	204.0	40.6	68	262.9	52.3
29	28.4	5.7	89	87.3	17.4	49	146.1	29.1	09	205.0	40.8	69	263.8	52.5
30	29.4	5.9	90	88.3	17.6	50	147.1	29.3	10	206.0	41.0	70	264.8	52.7
31	30.4	6.0	91	89.3	17.8	151	148.1	29.5	211	206.9	41.2	271	265.8	52.9
32	31.4	6.2	92	90.2	17.9	52	149.1	29.7	12	207.9	41.4	72	266.8	53.1
33	32.4	6.4	93	91.2	18.1	53	150.1	29.8	13	208.9	41.6	73	267.8	53.3
34	33.3	6.6	94	92.2	18.3	54	151.0	30.0	14	209.9	41.7	74	268.7	53.5
35	34.3	6.8	95	93.2	18.5	55	152.0	30.2	15	210.9	41.9	75	269.7	53.6
36	35.3	7.0	96	94.2	18.7	56	153.0	30.4	16	211.8	42.1	76	270.7	53.8
37	36.3	7.2	97	95.1	18.9	57	154.0	30.6	17	212.8	42.3	77	271.7	54.0
38	37.3	7.4	98	96.1	19.1	58	155.0	30.8	18	213.8	42.5	78	272.7	54.2
39	38.3	7.6	99	97.1	19.3	59	155.9	31.0	19	214.8	42.7	79	273.6	54.4
40	39.2	7.8	100	98.1	19.5	60	156.9	31.2	20	215.8	42.9	80	274.6	54.6
41	40.2	8.0	101	99.1	19.7	161	157.9	31.4	221	216.8	43.1	281	275.6	54.8
42	41.2	8.2	02	100.0	19.9	62	158.9	31.6	22	217.7	43.3	82	276.6	55.0
43	42.2	8.4	03	101.0	20.1	63	159.9	31.8	23	218.7	43.5	83	277.6	55.2
44	43.2	8.6	04	102.0	20.3	64	160.8	32.0	24	219.7	43.7	84	278.5	55.4
45	44.1	8.8	05	103.0	20.5	65	161.8	32.2	25	220.7	43.9	85	279.5	55.6
46	45.1	9.0	06	104.0	20.7	66	162.8	32.4	26	221.7	44.1	86	280.5	55.8
47	46.1	9.2	07	104.9	20.9	67	163.8	32.6	27	222.6	44.3	87	281.5	56.0
48	47.1	9.4	08	105.9	21.1	68	164.8	32.8	28	223.6	44.5	88	282.5	56.2
49	48.1	9.6	09	106.9	21.3	69	165.8	33.0	29	224.6	44.7	89	283.4	56.4
50	49.0	9.8	10	107.9	21.5	70	166.7	33.2	30	225.6	44.9	90	284.4	56.6
51	50.0	9.9	111	108.9	21.7	171	167.7	33.4	231	226.6	45.1	291	285.4	56.8
52	51.0	10.1	12	109.8	21.9	72	168.7	33.6	32	227.5	45.3	92	286.4	57.0
53	52.0	10.3	13	110.8	22.0	73	169.7	33.8	33	228.5	45.5	93	287.4	57.2
54	53.0	10.5	14	111.8	22.2	74	170.7	33.9	34	229.5	45.7	94	288.4	57.4
55	53.9	10.7	15	112.8	22.4	75	171.6	34.1	35	230.5	45.8	95	289.3	57.6
56	54.9	10.9	16	113.8	22.6	76	172.6	34.3	36	231.5	46.0	96	290.3	57.7
57	55.9	11.1	17	114.8	22.8	77	173.6	34.5	37	232.4	46.2	97	291.3	57.9
58	56.9	11.3	18	115.7	23.0	78	174.6	34.7	38	233.4	46.4	98	292.3	58.1
59	57.9	11.5	19	116.7	23.2	79	175.6	34.9	39	234.4	46.6	99	293.3	58.3
60	58.8	11.7	20	117.7	23.4	80	176.5	35.1	40	235.4	46.8	300	294.2	58.5
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

E. by N. E. by S. W. by N. W. by S. [For 7 points.

TABLE 1.

Difference of Latitude and Departure for 1¼ Points.

N. by E. ¼ E. N. by W. ¼ W. S. by E. ¼ E. S. by W. ¼ W.

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.2	61	59.2	14.8	121	117.4	29.4	181	175.6	44.0	241	233.8	58.6
2	1.9	0.5	62	60.1	15.1	22	118.3	29.6	82	176.5	44.2	42	234.7	58.8
3	2.9	0.7	63	61.1	15.3	23	119.3	29.9	83	177.5	44.5	43	235.7	59.0
4	3.9	1.0	64	62.1	15.6	24	120.3	30.1	84	178.5	44.7	44	236.7	59.3
5	4.9	1.2	65	63.1	15.8	25	121.3	30.4	85	179.5	45.0	45	237.7	59.5
6	5.8	1.5	66	64.0	16.0	26	122.2	30.6	86	180.4	45.2	46	238.6	59.8
7	6.8	1.7	67	65.0	16.3	27	123.2	30.9	87	181.4	45.4	47	239.6	60.0
8	7.8	1.9	68	66.0	16.5	28	124.2	31.1	88	182.4	45.7	48	240.6	60.3
9	8.7	2.2	69	66.9	16.8	29	125.1	31.3	89	183.3	45.9	49	241.5	60.5
10	9.7	2.4	70	67.9	17.0	30	126.1	31.6	90	184.3	46.2	50	242.5	60.7
11	10.7	2.7	71	68.9	17.3	131	127.1	31.8	191	185.3	46.4	251	243.5	61.0
12	11.6	2.9	72	69.8	17.5	32	128.0	32.1	92	186.2	46.7	52	244.4	61.2
13	12.6	3.2	73	70.8	17.7	33	129.0	32.3	93	187.2	46.9	53	245.4	61.5
14	13.6	3.4	74	71.8	18.0	34	130.0	32.6	94	188.2	47.1	54	246.4	61.7
15	14.6	3.6	75	72.8	18.2	35	131.0	32.8	95	189.2	47.4	55	247.4	62.0
16	15.5	3.9	76	73.7	18.5	36	131.9	33.0	96	190.1	47.6	56	248.3	62.2
17	16.5	4.1	77	74.7	18.7	37	132.9	33.3	97	191.1	47.9	57	249.3	62.4
18	17.5	4.4	78	75.7	19.0	38	133.9	33.5	98	192.1	48.1	58	250.3	62.7
19	18.4	4.6	79	76.6	19.2	39	134.8	33.8	99	193.0	48.4	59	251.2	62.9
20	19.4	4.9	80	77.6	19.4	40	135.8	34.0	200	194.0	48.6	60	252.2	63.2
21	20.4	5.1	81	78.6	19.7	141	136.8	34.3	201	195.0	48.8	261	253.2	63.4
22	21.3	5.3	82	79.5	19.9	42	137.7	34.5	02	195.9	49.1	62	254.1	63.7
23	22.3	5.6	83	80.5	20.2	43	138.7	34.7	03	196.9	49.3	63	255.1	63.9
24	23.3	5.8	84	81.5	20.4	44	139.7	35.0	04	197.9	49.6	64	256.1	64.1
25	24.3	6.1	85	82.5	20.7	45	140.7	35.2	05	198.9	49.8	65	257.1	64.4
26	25.2	6.3	86	83.4	20.9	46	141.6	35.5	06	199.8	50.1	66	258.0	64.6
27	26.2	6.6	87	84.4	21.1	47	142.6	35.7	07	200.8	50.3	67	259.0	64.9
28	27.2	6.8	88	85.4	21.4	48	143.6	36.0	08	201.8	50.5	68	260.0	65.1
29	28.1	7.0	89	86.3	21.6	49	144.5	36.2	09	202.7	50.8	69	260.9	65.4
30	29.1	7.3	90	87.3	21.9	50	145.5	36.4	10	203.7	51.0	70	261.9	65.6
31	30.1	7.5	91	88.3	22.1	151	146.5	36.7	211	204.7	51.3	271	262.9	65.8
32	31.0	7.8	92	89.2	22.4	52	147.4	36.9	12	205.6	51.5	72	263.8	66.1
33	32.0	8.0	93	90.2	22.6	53	148.4	37.2	13	206.6	51.8	73	264.8	66.3
34	33.0	8.3	94	91.2	22.8	54	149.4	37.4	14	207.6	52.0	74	265.8	66.6
35	34.0	8.5	95	92.2	23.1	55	150.4	37.7	15	208.6	52.2	75	266.8	66.8
36	34.9	8.7	96	93.1	23.3	56	151.3	37.9	16	209.5	52.5	76	267.7	67.1
37	35.9	9.0	97	94.1	23.6	57	152.3	38.1	17	210.5	52.7	77	268.7	67.3
38	36.9	9.2	98	95.1	23.8	58	153.3	38.4	18	211.5	53.0	78	269.7	67.5
39	37.8	9.5	99	96.0	24.1	59	154.2	38.6	19	212.4	53.2	79	270.6	67.8
40	38.8	9.7	100	97.0	24.3	60	155.2	38.9	20	213.4	53.5	80	271.6	68.0
41	39.8	10.0	101	98.0	24.5	161	156.2	39.1	221	214.4	53.7	281	272.6	68.3
42	40.7	10.2	02	98.9	24.8	62	157.1	39.4	22	215.3	53.9	82	273.5	68.5
43	41.7	10.4	03	99.9	25.0	63	158.1	39.6	23	216.3	54.2	83	274.5	68.8
44	42.7	10.7	04	100.9	25.3	64	159.1	39.8	24	217.3	54.4	84	275.5	69.0
45	43.7	10.9	05	101.9	25.5	65	160.1	40.1	25	218.3	54.7	85	277.5	69.2
46	44.6	11.2	06	102.8	25.8	66	161.0	40.3	26	219.2	54.9	86	277.4	69.5
47	45.6	11.4	07	103.8	26.0	67	162.0	40.6	27	220.2	55.2	87	278.4	69.7
48	46.6	11.7	08	104.8	26.2	68	163.0	40.8	28	221.2	55.4	88	279.4	70.0
49	47.5	11.9	09	105.7	26.5	69	163.9	41.1	29	222.1	55.6	89	280.3	70.2
50	48.5	12.1	10	106.7	26.7	70	164.9	41.3	30	223.1	55.9	90	281.3	70.5
51	49.5	12.4	111	107.7	27.0	171	165.9	41.5	231	224.1	56.1	291	282.3	70.7
52	50.4	12.6	12	108.6	27.2	72	166.8	41.8	32	225.0	56.4	92	283.2	71.0
53	51.4	12.9	13	109.6	27.5	73	167.8	42.0	33	226.0	56.6	93	284.2	71.2
54	52.4	13.1	14	110.6	27.7	74	168.8	42.3	34	227.0	56.9	94	285.2	71.4
55	53.4	13.4	15	111.6	27.9	75	169.8	42.5	35	228.0	57.1	95	286.2	71.7
56	54.3	13.6	16	112.5	28.2	76	170.7	42.8	36	228.9	57.3	96	287.1	71.9
57	55.3	13.8	17	113.5	28.4	77	171.7	43.0	37	229.9	57.6	97	288.1	72.2
58	56.3	14.1	18	114.5	28.7	78	172.7	43.3	38	230.9	57.8	98	289.1	72.4
59	57.2	14.3	19	115.4	28.9	79	173.6	43.5	39	231.8	58.1	99	290.9	72.7
60	58.2	14.6	20	116.4	29.2	80	174.6	43.7	40	232.8	58.3	300	291.0	72.9
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

ENE. ¾ E. ESE. ¾ E. WNW. ¾ W. WSW. ¾ W. [For 6¾ Points.

TABLE 1.

Difference of Latitude and Departure for 1½ Points.

N. by E. ½ E.			N. by W. ½ W.			S. by E. ½ E.			S. by W. ½ W.					
Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.3	61	58.4	17.7	121	115.8	35.1	181	173.2	52.5	241	230.6	70.0
2	1.9	0.6	62	59.3	18.0	22	116.7	35.4	82	174.2	52.8	42	231.6	70.2
3	2.9	0.9	63	60.3	18.3	23	117.7	35.7	83	175.1	53.1	43	232.5	70.5
4	3.8	1.2	64	61.2	18.6	24	118.7	36.0	84	176.1	53.4	44	233.5	70.8
5	4.8	1.5	65	62.2	18.9	25	119.6	36.3	85	177.0	53.7	45	234.5	71.1
6	5.7	1.7	66	63.2	19.2	26	120.6	36.6	86	178.0	54.0	46	235.4	71.4
7	6.7	2.0	67	64.1	19.4	27	121.5	36.9	87	178.9	54.3	47	236.4	71.7
8	7.7	2.3	68	65.1	19.7	28	122.5	37.2	88	179.9	54.6	48	237.3	72.0
9	8.6	2.6	69	66.0	20.0	29	123.4	37.4	89	180.9	54.9	49	238.3	72.3
10	9.6	2.9	70	67.0	20.3	30	124.4	37.7	90	181.8	55.2	50	239.2	72.6
11	10.5	3.2	71	67.9	20.6	131	125.4	38.0	191	182.8	55.4	251	240.2	72.9
12	11.5	3.5	72	68.9	20.9	32	126.3	38.3	92	183.7	55.7	52	241.1	73.2
13	12.4	3.8	73	69.9	21.2	33	127.3	38.6	93	184.7	56.0	53	242.1	73.4
14	13.4	4.1	74	70.8	21.5	34	128.2	38.9	94	185.6	56.3	54	243.1	73.7
15	14.4	4.4	75	71.8	21.8	35	129.2	39.2	95	186.6	56.6	55	244.0	74.0
16	15.3	4.6	76	72.7	22.1	36	130.1	39.5	96	187.6	56.9	56	245.0	74.3
17	16.3	4.9	77	73.7	22.4	37	131.1	39.8	97	188.5	57.2	57	245.9	74.6
18	17.2	5.2	78	74.6	22.6	38	132.1	40.1	98	189.5	57.5	58	246.9	74.9
19	18.2	5.5	79	75.6	22.9	39	133.0	40.3	99	190.4	57.8	59	247.8	75.2
20	19.1	5.8	80	76.6	23.2	40	134.0	40.6	200	191.4	58.1	60	248.8	75.5
21	20.1	6.1	81	77.5	23.5	141	134.9	40.9	201	192.3	58.3	261	249.8	75.8
22	21.1	6.4	82	78.5	23.8	42	135.9	41.2	02	193.3	58.6	62	250.7	76.1
23	22.0	6.7	83	79.4	24.1	43	136.8	41.5	03	194.3	58.9	63	251.7	76.3
24	23.0	7.0	84	80.4	24.4	44	137.8	41.8	04	195.2	59.2	64	252.6	76.6
25	23.9	7.3	85	81.3	24.7	45	138.8	42.1	05	196.2	59.5	65	253.6	76.9
26	24.9	7.5	86	82.3	25.0	46	139.7	42.4	06	197.1	59.8	66	254.5	77.2
27	25.8	7.8	87	83.3	25.3	47	140.7	42.7	07	198.1	60.1	67	255.5	77.5
28	26.8	8.1	88	84.2	25.5	48	141.6	43.0	08	199.0	60.4	68	256.5	77.8
29	27.8	8.4	89	85.2	25.8	49	142.6	43.3	09	200.0	60.7	69	257.4	78.1
30	28.7	8.7	90	86.1	26.1	50	143.5	43.5	10	201.0	61.0	70	258.4	78.4
31	29.7	9.0	91	87.1	26.4	151	144.5	43.8	211	201.9	61.3	271	259.3	78.7
32	30.6	9.3	92	88.0	26.7	52	145.5	44.1	12	202.9	61.5	72	260.3	79.0
33	31.6	9.6	93	89.0	27.0	53	146.4	44.4	13	203.8	61.8	73	261.2	79.2
34	32.5	9.9	94	90.0	27.3	54	147.4	44.7	14	204.8	62.1	74	262.2	79.5
35	33.5	10.2	95	90.9	27.6	55	148.3	45.0	15	205.7	62.4	75	263.2	79.8
36	34.4	10.5	96	91.9	27.9	56	149.3	45.3	16	206.7	62.7	76	264.1	80.1
37	35.4	10.7	97	92.8	28.2	57	150.2	45.6	17	207.7	63.0	77	265.1	80.4
38	36.4	11.0	98	93.8	28.4	58	151.2	45.9	18	208.6	63.3	78	266.0	80.7
39	37.3	11.3	99	94.7	28.7	59	152.2	46.2	19	209.6	63.6	79	267.0	81.0
40	38.3	11.6	100	95.7	29.0	60	153.1	46.4	20	210.5	63.9	80	267.9	81.3
41	39.2	11.9	101	96.7	29.3	161	154.1	46.7	221	211.5	64.2	281	268.9	81.6
42	40.2	12.2	02	97.6	29.6	62	155.0	47.0	22	212.4	64.4	82	269.9	81.9
43	41.1	12.5	03	98.6	29.9	63	156.0	47.3	23	213.4	64.7	83	270.8	82.2
44	42.1	12.8	04	99.5	30.2	64	156.9	47.6	24	214.4	65.0	84	271.8	82.4
45	43.1	13.1	05	100.5	30.5	65	157.9	47.9	25	215.3	65.3	85	272.7	82.7
46	44.0	13.4	06	101.4	30.8	66	158.9	48.2	26	216.3	65.6	86	273.7	83.0
47	45.0	13.6	07	102.4	31.1	67	159.8	48.5	27	217.2	65.9	87	274.6	83.3
48	45.9	13.9	08	103.3	31.4	68	160.8	48.8	28	218.2	66.2	88	275.6	83.6
49	46.9	14.2	09	104.3	31.6	69	161.7	49.1	29	219.1	66.5	89	276.6	83.9
50	47.8	14.5	10	105.3	31.9	70	162.7	49.3	30	220.1	66.8	90	277.5	84.2
51	48.8	14.8	111	106.2	32.2	171	163.6	49.6	231	221.1	67.1	291	278.5	84.5
52	49.8	15.1	12	107.2	32.5	72	164.6	49.9	32	222.0	67.3	92	279.4	84.8
53	50.7	15.4	13	108.1	32.8	73	165.6	50.2	33	223.0	67.6	93	280.4	85.1
54	51.7	15.7	14	109.1	33.1	74	166.5	50.5	34	223.9	67.9	94	281.3	85.3
55	52.6	16.0	15	110.0	33.4	75	167.5	50.8	35	224.9	68.2	95	282.3	85.6
56	53.6	16.3	16	111.0	33.7	76	168.4	51.1	36	225.8	68.5	96	283.3	85.9
57	54.5	16.5	17	112.0	34.0	77	169.4	51.4	37	226.8	68.8	97	284.2	86.2
58	55.5	16.8	18	112.9	34.3	78	170.3	51.7	38	227.8	69.1	98	285.2	86.5
59	56.5	17.1	19	113.9	34.5	79	171.3	52.0	39	228.7	69.4	99	286.1	86.8
60	57.4	17.4	20	114.8	34.8	80	172.2	52.3	40	229.7	69.7	300	287.1	87.1
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.
ENE. ½ E.			ESE. ½ E.			WNW. ½ W.			WSW. ½ W.			[For 6½ Points.		

TABLE 1.

Difference of Latitude and Departure for 1¾ Points.

N. by E. ¾ E. N. by W. ¾ W. S. by E. ¾ E. S. by W. ¾ W.

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.9	0.3	61	57.4	20.6	121	113.9	40.8	181	170.4	61.0	241	226.9	81.2
2	1.9	0.7	62	58.4	20.9	22	114.9	41.1	82	171.4	61.3	42	227.9	81.5
3	2.8	1.0	63	59.3	21.2	23	115.8	41.4	83	172.3	61.7	43	228.8	81.9
4	3.8	1.3	64	60.3	21.6	24	116.8	41.8	84	173.2	62.0	44	229.7	82.2
5	4.7	1.7	65	61.2	21.9	25	117.7	42.1	85	174.2	62.3	45	230.7	82.5
6	5.6	2.0	66	62.1	22.2	26	118.6	42.4	86	175.1	62.7	46	231.6	82.9
7	6.6	2.4	67	63.1	22.6	27	119.6	42.8	87	176.1	63.0	47	232.6	83.2
8	7.5	2.7	68	64.0	22.9	28	120.5	43.1	88	177.0	63.3	48	233.5	83.5
9	8.5	3.0	69	65.0	23.2	29	121.5	43.5	89	178.0	63.7	49	234.4	83.9
10	9.4	3.4	70	65.9	23.6	30	122.4	43.8	90	178.9	64.0	50	235.4	84.2
11	10.4	3.7	71	66.8	23.9	131	123.3	44.1	191	179.8	64.3	251	236.3	84.6
12	11.3	4.0	72	67.8	24.3	32	124.3	44.5	92	180.8	64.7	52	237.3	84.9
13	12.2	4.4	73	68.7	24.6	33	125.2	44.8	93	181.7	65.0	53	238.2	85.2
14	13.2	4.7	74	69.7	24.9	34	126.2	45.1	94	182.7	65.4	54	239.2	85.6
15	14.1	5.1	75	70.6	25.3	35	127.1	45.5	95	183.6	65.7	55	240.1	85.9
16	15.1	5.4	76	71.6	25.6	36	128.0	45.8	96	184.5	66.0	56	241.0	86.2
17	16.0	5.7	77	72.5	25.9	37	129.0	46.2	97	185.5	66.4	57	242.0	86.6
18	16.9	6.1	78	73.4	26.3	38	129.9	46.5	98	186.4	66.7	58	242.9	86.9
19	17.9	6.4	79	74.4	26.6	39	130.9	46.8	99	187.4	67.0	59	243.9	87.3
20	18.8	6.7	80	75.3	27.0	40	131.8	47.2	200	188.3	67.4	60	244.8	87.6
21	19.8	7.1	81	76.3	27.3	141	132.8	47.5	201	189.3	67.7	261	245.7	87.9
22	20.7	7.4	82	77.2	27.6	42	133.7	47.8	02	190.2	68.1	62	246.7	88.3
23	21.7	7.7	83	78.1	28.0	43	134.6	48.2	03	191.1	68.4	63	247.6	88.6
24	22.6	8.1	84	79.1	28.3	44	135.6	48.5	04	192.1	68.7	64	248.6	88.9
25	23.5	8.4	85	80.0	28.6	45	136.5	48.8	05	193.0	69.1	65	249.5	89.3
26	24.5	8.8	86	81.0	29.0	46	137.5	49.2	06	194.0	69.4	66	250.5	89.6
27	25.4	9.1	87	81.9	29.3	47	138.4	49.5	07	194.9	69.7	67	251.4	89.9
28	26.4	9.4	88	82.9	29.6	48	139.3	49.9	08	195.8	70.1	68	252.3	90.3
29	27.3	9.8	89	83.8	30.0	49	140.3	50.2	09	196.8	70.4	69	253.3	90.6
30	28.2	10.1	90	84.7	30.3	50	141.2	50.5	10	197.7	70.7	70	254.2	91.0
31	29.2	10.4	91	85.7	30.7	151	142.2	50.9	211	198.7	71.1	271	255.2	91.3
32	30.1	10.8	92	86.6	31.0	52	143.1	51.2	12	199.6	71.4	72	256.1	91.6
33	31.1	11.1	93	87.6	31.3	53	144.1	51.5	13	200.5	71.8	73	257.0	92.0
34	32.0	11.5	94	88.5	31.7	54	145.0	51.9	14	201.5	72.1	74	258.0	92.3
35	33.0	11.8	95	89.4	32.0	55	145.9	52.2	15	202.4	72.4	75	258.9	92.6
36	33.9	12.1	96	90.4	32.3	56	146.9	52.6	16	203.4	72.8	76	259.9	93.0
37	34.8	12.5	97	91.3	32.7	57	147.8	52.9	17	204.3	73.1	77	260.8	93.3
38	35.8	12.8	98	92.3	33.0	58	148.8	53.2	18	205.3	73.4	78	261.7	93.7
39	36.7	13.1	99	93.2	33.4	59	149.7	53.6	19	206.2	73.8	79	262.7	94.0
40	37.7	13.5	100	94.2	33.7	60	150.6	53.9	20	207.1	74.1	80	263.6	94.3
41	38.6	13.8	101	95.1	34.0	161	151.6	54.2	221	208.1	74.5	281	264.6	94.7
42	39.5	14.1	02	96.0	34.4	62	152.5	54.6	22	209.0	74.8	82	265.5	95.0
43	40.5	14.5	03	97.0	34.7	63	153.5	54.9	23	210.0	75.1	83	266.5	95.3
44	41.4	14.8	04	97.9	35.0	64	154.4	55.2	24	210.9	75.5	84	267.4	95.7
45	42.4	15.2	05	98.9	35.4	65	155.4	55.6	25	211.8	75.8	85	268.3	96.0
46	43.3	15.5	06	99.8	35.7	66	156.3	55.9	26	212.8	76.1	86	269.3	96.4
47	44.3	15.8	07	100.7	36.0	67	157.2	56.3	27	213.7	76.5	87	270.2	96.7
48	45.2	16.2	08	101.7	36.4	68	158.2	56.6	28	214.7	76.8	88	271.2	97.0
49	46.1	16.5	09	102.6	36.7	69	159.1	56.9	29	215.6	77.1	89	272.1	97.4
50	47.1	16.8	10	103.6	37.1	70	160.1	57.3	30	216.6	77.5	90	273.0	97.7
51	48.0	17.2	111	104.5	37.4	171	161.0	57.6	231	217.5	77.8	291	274.0	98.0
52	49.0	17.5	12	105.5	37.7	72	161.9	57.9	32	218.4	78.2	92	274.9	98.4
53	49.9	17.9	13	106.4	38.1	73	162.9	58.3	33	219.4	78.5	93	275.9	98.7
54	50.8	18.2	14	107.3	38.4	74	163.8	58.6	34	220.3	78.8	94	276.8	99.0
55	51.8	18.5	15	108.3	38.7	75	164.8	59.0	35	221.3	79.2	95	277.8	99.4
56	52.7	18.9	16	109.2	39.1	76	165.7	59.3	36	222.2	79.5	96	278.7	99.7
57	53.7	19.2	17	110.2	39.4	77	166.7	59.6	37	223.1	79.8	97	279.6	100.1
58	54.6	19.5	18	111.1	39.8	78	167.6	60.0	38	224.1	80.2	98	280.6	100.4
59	55.6	19.9	19	112.0	40.1	79	168.5	60.3	39	225.0	80.5	99	281.5	100.7
60	56.5	20.2	20	113.0	40.4	80	169.5	60.6	40	226.0	80.9	300	282.5	101.1
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

ENE. ¼ E. ESE. ¼ E. WNW. ¼ W. WSW. ¼ W. [For 6¼ Points.

TABLE 1.

Difference of Latitude and Departure for 2 Points.

NNE. NNW. SSE. SSW.

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.9	0.4	61	56.4	23.3	121	111.8	46.3	181	167.2	69.3	241	222.7	92.2
2	1.8	0.8	62	57.3	23.7	22	112.7	46.7	82	168.1	69.6	42	223.6	92.6
3	2.8	1.1	63	58.2	24.1	23	113.6	47.1	83	169.1	70.0	43	224.5	93.0
4	3.7	1.5	64	59.1	24.5	24	114.6	47.5	84	170.0	70.4	44	225.4	93.4
5	4.6	1.9	65	60.1	24.9	25	115.5	47.8	85	170.9	70.8	45	226.4	93.8
6	5.5	2.3	66	61.0	25.3	26	116.4	48.2	86	171.8	71.2	46	227.3	94.1
7	6.5	2.7	67	61.9	25.6	27	117.3	48.6	87	172.8	71.6	47	228.2	94.5
8	7.4	3.1	68	62.8	26.0	28	118.3	49.0	88	173.7	71.9	48	229.1	94.9
9	8.3	3.4	69	63.7	26.4	29	119.2	49.4	89	174.6	72.3	49	230.0	95.3
10	9.2	3.8	70	64.7	26.8	30	120.1	49.7	90	175.5	72.7	50	231.0	95.7
11	10.2	4.2	71	65.6	27.2	131	121.0	50.1	191	176.5	73.1	251	231.9	96.1
12	11.1	4.6	72	66.5	27.6	32	122.0	50.5	92	177.4	73.5	52	232.8	96.4
13	12.0	5.0	73	67.4	27.9	33	122.9	50.9	93	178.3	73.9	53	233.7	96.8
14	12.9	5.4	74	68.4	28.3	34	123.8	51.3	94	179.2	74.2	54	234.7	97.2
15	13.9	5.7	75	69.3	28.7	35	124.7	51.7	95	180.2	74.6	55	235.6	97.6
16	14.8	6.1	76	70.2	29.1	36	125.6	52.0	96	181.1	75.0	56	236.5	98.0
17	15.7	6.5	77	71.1	29.5	37	126.6	52.4	97	182.0	75.4	57	237.4	98.3
18	16.6	6.9	78	72.1	29.8	38	127.5	52.8	98	182.9	75.8	58	238.4	98.7
19	17.6	7.3	79	73.0	30.2	39	128.4	53.2	99	183.9	76.2	59	239.3	99.1
20	18.5	7.7	80	73.9	30.6	40	129.3	53.6	200	184.8	76.5	60	240.2	99.5
21	19.4	8.0	81	74.8	31.0	141	130.3	54.0	201	185.7	76.9	261	241.1	99.9
22	20.3	8.4	82	75.8	31.4	42	131.2	54.3	02	186.6	77.3	62	242.1	100.3
23	21.2	8.8	83	76.7	31.8	43	132.1	54.7	03	187.5	77.7	63	243.0	100.6
24	22.2	9.2	84	77.6	32.1	44	133.0	55.1	04	188.5	78.1	64	243.9	101.0
25	23.1	9.6	85	78.5	32.5	45	134.0	55.5	05	189.4	78.5	65	244.8	101.4
26	24.0	9.9	86	79.5	32.9	46	134.9	55.9	06	190.3	78.8	66	245.8	101.8
27	24.9	10.3	87	80.4	33.3	47	135.8	56.3	07	191.2	79.2	67	246.7	102.2
28	25.9	10.7	88	81.3	33.7	48	136.7	56.6	08	192.2	79.6	68	247.6	102.6
29	26.8	11.1	89	82.2	34.1	49	137.7	57.0	09	193.1	80.0	69	248.5	102.9
30	27.7	11.5	90	83.1	34.4	50	138.6	57.4	10	194.0	80.4	70	249.4	103.3
31	28.6	11.9	91	84.1	34.8	151	139.5	57.8	211	194.9	80.7	271	250.4	103.7
32	29.6	12.2	92	85.0	35.2	52	140.4	58.2	12	195.9	81.1	72	251.3	104.1
33	30.5	12.6	93	85.9	35.6	53	141.4	58.6	13	196.8	81.5	73	252.2	104.5
34	31.4	13.0	94	86.8	36.0	54	142.3	58.9	14	197.7	81.9	74	253.1	104.9
35	32.3	13.4	95	87.8	36.4	55	143.2	59.3	15	198.6	82.3	75	254.1	105.2
36	33.3	13.8	96	88.7	36.7	56	144.1	59.7	16	199.6	82.7	76	255.0	105.6
37	34.2	14.2	97	89.6	37.1	57	145.0	60.1	17	200.5	83.0	77	255.9	106.0
38	35.1	14.5	98	90.5	37.5	58	146.0	60.5	18	201.4	83.4	78	256.8	106.4
39	36.0	14.9	99	91.5	37.9	59	146.9	60.8	19	202.3	83.8	79	257.8	106.8
40	37.0	15.3	100	92.4	38.3	60	147.8	61.2	20	203.3	84.2	80	258.7	107.2
41	37.9	15.7	101	93.3	38.7	161	148.7	61.6	221	204.2	84.6	281	259.6	107.5
42	38.8	16.1	02	94.2	39.0	62	149.7	62.0	22	205.1	85.0	82	260.5	107.9
43	39.7	16.5	03	95.2	39.4	63	150.6	62.4	23	206.0	85.3	83	261.5	108.3
44	40.7	16.8	04	96.1	39.8	64	151.5	62.8	24	206.9	85.7	84	262.4	108.7
45	41.6	17.2	05	97.0	40.2	65	152.4	63.1	25	207.9	86.1	85	263.3	109.1
46	42.5	17.6	06	97.9	40.6	66	153.4	63.5	26	208.8	86.5	86	264.2	109.4
47	43.4	18.0	07	98.9	40.9	67	154.3	63.9	27	209.7	86.9	87	265.2	109.8
48	44.3	18.4	08	99.8	41.3	68	155.2	64.3	28	210.6	87.3	88	266.1	110.2
49	45.3	18.8	09	100.7	41.7	69	156.1	64.7	29	211.6	87.6	89	267.0	110.6
50	46.2	19.1	10	101.6	42.1	70	157.1	65.1	30	212.5	88.0	90	267.9	111.0
51	47.1	19.5	111	102.6	42.5	171	158.0	65.4	231	213.4	88.4	291	268.8	111.4
52	48.0	19.9	12	103.5	42.9	72	158.9	65.8	32	214.3	88.8	92	269.8	111.7
53	49.0	20.3	13	104.4	43.2	73	159.8	66.2	33	215.3	89.2	93	270.7	112.1
54	49.9	20.7	14	105.3	43.6	74	160.8	66.6	34	216.2	89.5	94	271.6	112.5
55	50.8	21.0	15	106.2	44.0	75	161.7	67.0	35	217.1	89.9	95	272.5	112.9
56	51.7	21.4	16	107.2	44.4	76	162.6	67.4	36	218.0	90.3	96	273.5	113.3
57	52.7	21.8	17	108.1	44.8	77	163.5	67.7	37	219.0	90.7	97	274.4	113.7
58	53.6	22.2	18	109.0	45.2	78	164.5	68.1	38	219.9	91.1	98	275.3	114.0
59	54.5	22.6	19	109.9	45.5	79	165.4	68.5	39	220.8	91.5	99	276.2	114.4
60	55.4	23.0	20	110.9	45.9	80	166.3	68.9	40	221.7	91.8	300	277.2	114.8
Dist.	Dep.	Lat.	Dist.	Dep.	Lat,	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

ENE. ESE. WNW WSW [For 6 Points.

TABLE 1.

Difference of Latitude and Departure for 2¼ Points.

NNE. ¼ E. NNW. ¼ W. SSE. ¼ E. SSW. ¼ W.

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.9	0.4	61	55.1	26.1	121	109.4	51.7	181	163.6	77.4	241	217.9	103.0
2	1.8	0.9	62	56.0	26.5	22	110.3	52.2	82	164.5	77.8	42	218.8	103.5
3	2.7	1.3	63	57.0	26.9	23	111.2	52.6	83	165.4	78.2	43	219.7	103.9
4	3.6	1.7	64	57.9	27.4	24	112.1	53.0	84	166.3	78.7	44	220.6	104.3
5	4.5	2.1	65	58.8	27.8	25	113.0	53.4	85	167.2	79.1	45	221.5	104.8
6	5.4	2.6	66	59.7	28.2	26	113.9	53.9	86	168.1	79.5	46	222.4	105.2
7	6.3	3.0	67	60.6	28.6	27	114.8	54.3	87	169.0	80.0	47	223.3	105.6
8	7.2	3.4	68	61.5	29.1	28	115.7	54.7	88	169.9	80.4	48	224.2	106.0
9	8.1	3.8	69	62.4	29.5	29	116.6	55.2	89	170.9	80.8	49	225.1	106.5
10	9.0	4.3	70	63.3	29.9	30	117.5	55.6	90	171.8	81.2	50	226.0	106.9
11	9.9	4.7	71	64.2	30.4	131	118.4	56.0	191	172.7	81.7	251	226.9	107.3
12	10.8	5.1	72	65.1	30.8	32	119.3	56.4	92	173.6	82.1	52	227.8	107.7
13	11.8	5.6	73	66.0	31.2	33	120.2	56.9	93	174.5	82.5	53	228.7	108.2
14	12.7	6.0	74	66.9	31.6	34	121.1	57.3	94	175.4	82.9	54	229.6	108.6
15	13.6	6.4	75	67.8	32.1	35	122.0	57.7	95	176.3	83.4	55	230.5	109.0
16	14.5	6.8	76	68.7	32.5	36	122.9	58.1	96	177.2	83.8	56	231.4	109.5
17	15.4	7.3	77	69.6	32.9	37	123.8	58.6	97	178.1	84.2	57	232.3	109.9
18	16.3	7.7	78	70.5	33.3	38	124.8	59.0	98	179.0	84.7	58	233.2	110.3
19	17.2	8.1	79	71.4	33.8	39	125.7	59.4	99	179.9	85.1	59	234.1	110.7
20	18.1	8.6	80	72.3	34.2	40	126.6	59.9	200	180.8	85.5	60	235.0	111.2
21	19.0	9.0	81	73.2	34.6	141	127.5	60.3	201	181.7	85.9	261	235.9	111.6
22	19.9	9.4	82	74.1	35.1	42	128.4	60.7	02	182.6	86.4	62	236.8	112.0
23	20.8	9.8	83	75.0	35.5	43	129.3	61.1	03	183.5	86.8	63	237.7	112.4
24	21.7	10.3	84	75.9	35.9	44	130.2	61.6	04	184.4	87.2	64	238.7	112.9
25	22.6	10.7	85	76.8	36.3	45	131.1	62.0	05	185.3	87.6	65	239.6	113.3
26	23.5	11.1	86	77.7	36.8	46	132.0	62.4	06	186.2	88.1	66	240.5	113.7
27	24.4	11.5	87	78.6	37.2	47	132.9	62.9	07	187.1	88.5	67	241.4	114.2
28	25.3	12.0	88	79.6	37.6	48	133.8	63.3	08	188.0	88.9	68	242.3	114.6
29	26.2	12.4	89	80.5	38.1	49	134.7	63.7	09	188.9	89.4	69	243.2	115.0
30	27.1	12.8	90	81.4	38.5	50	135.6	64.1	10	189.8	89.8	70	244.1	115.4
31	28.0	13.3	91	82.3	38.9	151	136.5	64.6	211	190.7	90.2	271	245.0	115.9
32	28.9	13.7	92	83.2	39.3	52	137.4	65.0	12	191.6	90.6	72	245.9	116.3
33	29.8	14.1	93	84.1	39.8	53	138.3	65.4	13	192.5	91.1	73	246.8	116.7
34	30.7	14.5	94	85.0	40.2	54	139.2	65.8	14	193.5	91.5	74	247.7	117.2
35	31.6	15.0	95	85.9	40.6	55	140.1	66.3	15	194.4	91.9	75	248.6	117.6
36	32.5	15.4	96	86.8	41.0	56	141.0	66.7	16	195.3	92.4	76	249.5	118.0
37	33.4	15.8	97	87.7	41.5	57	141.9	67.1	17	196.2	92.8	77	250.4	118.4
38	34.4	16.2	98	88.6	41.9	58	142.8	67.6	18	197.1	93.2	78	251.3	118.9
39	35.3	16.7	99	89.5	42.3	59	143.7	68.0	19	198.0	93.6	79	252.2	119.3
40	36.2	17.1	100	90.4	42.8	60	144.6	68.4	20	198.9	94.1	80	253.1	119.7
41	37.1	17.5	101	91.3	43.2	161	145.5	68.8	221	199.8	94.5	281	254.0	120.1
42	38.0	18.0	02	92.2	43.6	62	146.4	69.3	22	200.7	94.9	82	254.9	120.6
43	38.9	18.4	03	93.1	44.0	63	147.4	69.7	23	201.6	95.3	83	255.8	121.0
44	39.8	18.8	04	94.0	44.5	64	148.3	70.1	24	202.5	95.8	84	256.7	121.4
45	40.7	19.2	05	94.9	44.9	65	149.2	70.5	25	203.4	96.2	85	257.6	121.9
46	41.6	19.7	06	95.8	45.3	66	150.1	71.0	26	204.3	96.6	86	258.5	122.3
47	42.5	20.1	07	96.7	45.7	67	151.0	71.4	27	205.2	97.1	87	259.4	122.7
48	43.4	20.5	08	97.6	46.2	68	151.9	71.8	28	206.1	97.5	88	260.3	123.1
49	44.3	21.0	09	98.5	46.6	69	152.8	72.3	29	207.0	97.9	89	261.3	123.6
50	45.2	21.4	10	99.4	47.0	70	153.7	72.7	30	207.9	98.3	90	262.2	124.0
51	46.1	21.8	111	100.3	47.5	171	154.6	73.1	231	208.8	98.8	291	263.1	124.4
52	47.0	22.2	12	101.2	47.9	72	155.5	73.5	32	209.7	99.2	92	264.0	124.8
53	47.9	22.7	13	102.2	48.3	73	156.4	74.0	33	210.6	99.6	93	264.9	125.3
54	48.8	23.1	14	103.1	48.7	74	157.3	74.4	34	211.5	100.0	94	265.8	125.7
55	49.7	23.5	15	104.0	49.2	75	158.2	74.8	35	212.4	100.5	95	266.7	126.1
56	50.6	23.9	16	104.9	49.6	76	159.1	75.2	36	213.3	100.9	96	267.6	126.6
57	51.5	24.4	17	105.8	50.0	77	160.0	75.7	37	214.2	101.3	97	268.5	127.0
58	52.4	24.8	18	106.7	50.5	78	160.9	76.1	38	215.1	101.8	98	269.4	127.4
59	53.3	25.2	19	107.6	50.9	79	161.8	76.5	39	216.1	102.2	99	270.3	127.8
60	54.2	25.7	20	108.5	51.3	80	162.7	77.0	40	217.0	102.6	300	271.2	128.3
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

NE. by E. ¾ E. SE. by E. ¾ E. NW. by W. ¾ W. SW. by W. ¾ W. [For 5¾ Points.

TABLE 1.

Difference of Latitude and Departure for 2½ Points.

NNE. ½ E. NNW. ½ W. SSE. ½ E. SSW. ½ W.

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.9	0.5	61	53.8	28.8	121	106.7	57.0	181	159.6	85.3	241	212.5	113.6
2	1.8	0.9	62	54.7	29.2	22	107.6	57.5	82	160.5	85.8	42	213.4	114.1
3	2.6	1.4	63	55.6	29.7	23	108.5	58.0	83	161.4	86.3	43	214.3	114.5
4	3.5	1.9	64	56.4	30.2	24	109.4	58.5	84	162.3	86.7	44	215.2	115.0
5	4.4	2.4	65	57.3	30.6	25	110.2	58.9	85	163.2	87.2	45	216.1	115.5
6	5.3	2.8	66	58.2	31.1	26	111.1	59.4	86	164.0	87.7	46	217.0	116.0
7	6.2	3.3	67	59.1	31.6	27	112.0	59.9	87	164.9	88.2	47	217.8	116.4
8	7.1	3.8	68	60.0	32.1	28	112.9	60.3	88	165.8	88.6	48	218.7	116.9
9	7.9	4.2	69	60.9	32.5	29	113.8	60.8	89	166.7	89.1	49	219.6	117.4
10	8.8	4.7	70	61.7	33.0	30	114.6	61.3	90	167.6	89.6	50	220.5	117.8
11	9.7	5.2	71	62.6	33.5	131	115.5	61.8	191	168.4	90.0	251	221.4	118.3
12	10.6	5.7	72	63.5	33.9	32	116.4	62.2	92	169.3	90.5	52	222.2	118.8
13	11.5	6.1	73	64.4	34.4	33	117.3	62.7	93	170.2	91.0	53	223.1	119.3
14	12.3	6.6	74	65.3	34.9	34	118.2	63.2	94	171.1	91.5	54	224.0	119.7
15	13.2	7.1	75	66.1	35.4	35	119.1	63.6	95	172.0	91.9	55	224.9	120.2
16	14.1	7.5	76	67.0	35.8	36	119.9	64.1	96	172.9	92.4	56	225.8	120.7
17	15.0	8.0	77	67.9	36.3	37	120.8	64.6	97	173.7	92.9	57	226.7	121.1
18	15.9	8.5	78	68.8	36.8	38	121.7	65.1	98	174.6	93.3	58	227.5	121.6
19	16.8	9.0	79	69.7	37.2	39	122.6	65.5	99	175.5	93.8	59	228.4	122.1
20	17.6	9.4	80	70.6	37.7	40	123.5	66.0	200	176.4	94.3	60	229.3	122.6
21	18.5	9.9	81	71.4	38.2	141	124.4	66.5	201	177.3	94.8	261	330.2	123.0
22	19.4	10.4	82	72.3	38.7	42	125.2	66.9	02	178.1	95.2	62	231.1	123.5
23	20.3	10.8	83	73.2	39.1	43	126.1	67.4	03	179.0	95.7	63	231.9	124.0
24	21.2	11.3	84	74.1	39.6	44	127.0	67.9	04	179.9	96.2	64	232.8	124.4
25	22.0	11.8	85	75.0	40.1	45	127.9	68.4	05	180.8	96.6	65	233.7	124.9
26	22.9	12.3	86	75.8	40.5	46	128.8	68.8	06	181.7	97.1	66	234.6	125.4
27	23.8	12.7	87	76.7	41.0	47	129.6	69.3	07	182.6	97.6	67	235.5	125.9
28	24.7	13.2	88	77.6	41.5	48	130.5	69.8	08	183.4	98.1	68	236.4	126.3
29	25.6	13.7	89	78.5	42.0	49	131.4	70.2	09	184.3	98.5	69	237.2	126.8
30	26.5	14.1	90	79.4	42.4	50	132.3	70.7	10	185.2	99.0	70	238.1	127.3
31	27.3	14.6	91	80.3	42.9	151	133.2	71.2	211	186.1	99.5	271	239.0	127.7
32	28.2	15.1	92	81.1	43.4	52	134.1	71.7	12	187.0	99.9	72	239.9	128.2
33	29.1	15.6	93	82.0	43.8	53	134.9	72.1	13	187.8	100.4	73	240.8	128.7
34	30.0	16.0	94	82.9	44.3	54	135.8	72.6	14	188.7	100.9	74	241.6	129.2
35	30.9	16.5	95	83.8	44.8	55	136.7	73.1	15	189.6	101.4	75	242.5	129.6
36	31.7	17.0	96	84.7	45.3	56	137.6	73.5	16	190.5	101.8	76	243.4	130.1
37	32.6	17.4	97	85.5	45.7	57	138.5	74.0	17	191.4	102.3	77	244.3	130.6
38	33.5	17.9	98	86.4	46.2	58	139.3	74.5	18	192.3	102.8	78	245.2	131.0
39	34.4	18.4	99	87.3	46.7	59	140.2	75.0	19	193.1	103.2	79	246.1	131.5
40	35.3	18.9	100	88.2	47.1	60	141.1	75.4	20	194.0	103.7	80	246.9	132.0
41	36.2	19.3	101	89.1	47.6	161	142.0	75.9	221	194.9	104.2	281	247.8	132.5
42	37.0	19.8	02	90.0	48.1	62	142.9	76.4	22	195.8	104.7	82	248.7	132.9
43	37.9	20.3	03	90.8	48.6	63	143.8	76.8	23	196.7	105.1	83	249.6	133.4
44	38.8	20.7	04	91.7	49.0	64	144.6	77.3	24	197.6	105.6	84	250.5	133.9
45	39.7	21.2	05	92.6	49.5	65	145.5	77.8	25	198.4	106.1	85	251.3	134.3
46	40.6	21.7	06	93.5	50.0	66	146.4	78.3	26	199.3	106.5	86	252.2	134.8
47	41.5	22.2	07	94.4	50.4	67	147.3	78.7	27	200.2	107.0	87	253.1	135.3
48	42.3	22.6	08	95.2	50.9	68	148.2	79.2	28	201.1	107.5	88	254.0	135.8
49	43.2	23.1	09	96.1	51.4	69	149.0	79.7	29	202.0	107.9	89	254.9	136.2
50	44.1	23.6	10	97.0	51.9	70	149.9	80.1	30	202.8	108.4	90	255.8	136.7
51	45.0	24.0	111	97.9	52.3	171	150.8	80.6	231	203.7	108.9	291	256.6	137.2
52	45.9	24.5	12	98.8	52.8	72	151.7	81.1	32	204.6	109.4	92	257.5	137.6
53	46.7	25.0	13	99.7	53.3	73	152.6	81.6	33	205.5	109.8	93	258.4	138.1
54	47.6	25.5	14	100.5	53.7	74	153.5	82.0	34	206.4	110.3	94	259.3	138.6
55	48.5	25.9	15	101.4	54.2	75	154.3	82.5	35	207.3	110.8	95	260.2	139.1
56	49.4	26.4	16	102.3	54.7	76	155.2	83.0	36	208.1	111.2	96	261.0	139.5
57	50.3	26.9	17	103.2	55.2	77	156.1	83.4	37	209.0	111.7	97	261.9	140.0
58	51.2	27.3	18	104.1	55.6	78	157.0	83.9	38	209.9	112.2	98	262.8	140.5
59	52.0	27.8	19	104.9	56.1	79	157.9	84.4	39	210.8	112.7	99	263.7	140.9
60	52.9	28.3	20	105.8	56.6	80	158.7	84.9	40	211.7	113.1	300	264.6	141.4
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

NE. by E. ½ E. SE. by E. ½ E. NW. by W. ½ W. SW. by W. ½ W. [For 5½ Points.

TABLE 1.

Difference of Latitude and Departure for 2¾ Points.

NNE. ¾ E. NNW. ¾ W. SSE. ¾ E. SSW. ¾ W.

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.9	0.5	61	52.3	31.4	121	103.8	62.2	181	155.2	93.1	241	206.7	123.9
2	1.7	1.0	62	53.2	31.9	22	104.6	62.7	82	156.1	93.6	42	207.6	124.4
3	2.6	1.5	63	54.0	32.4	23	105.5	63.2	83	157.0	94.1	43	208.4	124.9
4	3.4	2.1	64	54.9	32.9	24	106.4	63.7	84	157.8	94.6	44	209.3	125.4
5	4.3	2.6	65	55.8	33.4	25	107.2	64.3	85	158.7	95.1	45	210.1	126.0
6	5.1	3.1	66	56.6	33.9	26	108.1	64.8	86	159.5	95.6	46	211.0	126.5
7	6.0	3.6	67	57.5	34.4	27	108.9	65.3	87	160.4	96.1	47	211.9	127.0
8	6.9	4.1	68	58.3	35.0	28	109.8	65.8	88	161.3	96.7	48	212.7	127.5
9	7.7	4.6	69	59.2	35.5	29	110.6	66.3	89	162.1	97.2	49	213.6	128.0
10	8.6	5.1	70	60.0	36.0	30	111.5	66.8	90	163.0	97.7	50	214.4	128.5
11	9.4	5.7	71	60.9	36.5	131	112.4	67.3	191	163.8	98.2	251	215.3	129.0
12	10.3	6.2	72	61.8	37.0	32	113.2	67.9	92	164.7	98.7	52	216.1	129.6
13	11.2	6.7	73	62.6	37.5	33	114.1	68.4	93	165.5	99.2	53	217.0	130.1
14	12.0	7.2	74	63.5	38.0	34	114.9	68.9	94	166.4	99.7	54	217.9	130.6
15	12.9	7.7	75	64.3	38.6	35	115.8	69.4	95	167.3	100.3	55	218.7	131.1
16	13.7	8.2	76	65.2	39.1	36	116.7	69.9	96	168.1	100.8	56	219.6	131.6
17	14.6	8.7	77	66.0	39.6	37	117.5	70.4	97	169.0	101.3	57	220.4	132.1
18	15.4	9.3	78	66.9	40.1	38	118.4	70.9	98	169.8	101.8	58	221.3	132.6
19	16.3	9.8	79	67.8	40.6	39	119.2	71.5	99	170.7	102.3	59	222.2	133.2
20	17.2	10.3	80	68.6	41.1	40	120.1	72.0	200	171.5	102.8	60	223.0	133.7
21	18.0	10.8	81	69.5	41.6	141	120.9	72.5	201	172.4	103.3	261	223.9	134.2
22	18.9	11.3	82	70.3	42.2	42	121.8	73.0	02	173.3	103.8	62	224.7	134.7
23	19.7	11.8	83	71.2	42.7	43	122.7	73.5	03	174.1	104.4	63	225.6	135.2
24	20.6	12.3	84	72.0	43.2	44	123.5	74.0	04	175.0	104.9	64	226.4	135.7
25	21.4	12.9	85	72.9	43.7	45	124.4	74.5	05	175.8	105.4	65	227.3	136.2
26	22.3	13.4	86	73.8	44.2	46	125.2	75.1	06	176.7	105.9	66	228.2	136.8
27	23.2	13.9	87	74.6	44.7	47	126.1	75.6	07	177.5	106.4	67	229.0	137.3
28	24.0	14.4	88	75.5	45.2	48	126.9	76.1	08	178.4	106.9	68	229.9	137.8
29	24.9	14.9	89	76.3	45.8	49	127.8	76.6	09	179.3	107.4	69	230.7	138.3
30	25.7	15.4	90	77.2	46.3	50	128.7	77.1	10	180.1	108.0	70	231.6	138.8
31	26.6	15.9	91	78.1	46.8	151	129.5	77.6	211	181.0	108.5	271	232.4	139.3
32	27.4	16.5	92	78.9	47.3	52	130.4	78.1	12	181.8	109.0	72	233.3	139.8
33	28.3	17.0	93	79.8	47.8	53	131.2	78.7	13	182.7	109.5	73	234.2	140.4
34	29.2	17.5	94	80.6	48.3	54	132.1	79.2	14	183.6	110.0	74	235.0	140.9
35	30.0	18.0	95	81.5	48.8	55	132.9	79.7	15	184.4	110.5	75	235.9	141.4
36	30.9	18.5	96	82.3	49.4	56	133.8	80.2	16	185.3	111.0	76	236.7	141.9
37	31.7	19.0	97	83.2	49.9	57	134.7	80.7	17	186.1	111.6	77	237.6	142.4
38	32.6	19.5	98	84.1	50.4	58	135.5	81.2	18	187.0	112.1	78	238.4	142.9
39	33.5	20.1	99	84.9	50.9	59	136.4	81.7	19	187.8	112.6	79	239.3	143.4
40	34.3	20.6	100	85.8	51.4	60	137.2	82.3	20	188.7	113.1	80	240.2	143.9
41	35.2	21.1	101	86.6	51.9	161	138.1	82.8	221	189.6	113.6	281	241.0	144.5
42	36.0	21.6	02	87.5	52.4	62	139.0	83.3	22	190.4	114.1	82	241.9	145.0
43	36.9	22.1	03	88.3	53.0	63	139.8	83.8	23	191.3	114.6	83	242.7	145.5
44	37.7	22.6	04	89.2	53.5	64	140.7	84.3	24	192.1	115.2	84	243.6	146.0
45	38.6	23.1	05	90.1	54.0	65	141.5	84.8	25	193.0	115.7	85	244.5	146.5
46	39.5	23.6	06	90.9	54.5	66	142.4	85.3	26	193.8	116.2	86	245.3	147.0
47	40.3	24.2	07	91.8	55.0	67	143.2	85.9	27	194.7	116.7	87	246.2	147.5
48	41.2	24.7	08	92.6	55.5	68	144.1	86.4	28	195.6	117.2	88	247.0	148.1
49	42.0	25.2	09	93.5	56.0	69	145.0	86.9	29	196.4	117.7	89	247.9	148.6
50	42.9	25.7	10	94.4	56.6	70	145.8	87.4	30	197.3	118.2	90	248.7	149.1
51	43.7	26.2	111	95.2	57.1	171	146.7	87.9	231	198.1	118.8	291	249.6	149.6
52	44.6	26.7	12	96.1	57.6	72	147.5	88.4	32	199.0	119.3	92	250.5	150.1
53	45.5	27.2	13	96.9	58.1	73	148.4	88.9	33	199.9	119.8	93	251.3	150.6
54	46.3	27.8	14	97.8	58.6	74	149.2	89.5	34	200.7	120.3	94	252.2	151.1
55	47.2	28.3	15	98.6	59.1	75	150.1	90.0	35	201.6	120.8	95	253.0	151.7
56	48.0	28.8	16	99.5	59.6	76	151.0	90.5	36	202.4	121.3	96	253.9	152.2
57	48.9	29.3	17	100.4	60.2	77	151.8	91.0	37	203.3	121.8	97	254.7	152.7
58	49.7	29.8	18	101.2	60.7	78	152.7	91.5	38	204.1	122.4	98	255.6	153.2
59	50.6	30.3	19	102.1	61.2	79	153.5	92.0	39	205.0	122.9	99	256.5	153.7
60	51.5	30.8	20	102.9	61.7	80	154.4	92.5	40	205.9	123.4	300	257.3	154.2
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

NE. by E. ¼ E. SE. by E. ¼ E. NW. by W. ¼ W. SW. by W. ¼ W. [For 5¼ Points.

TABLE 1.

Difference of Latitude and Departure for 3 Points.

NE. by N. NW. by N. SE. by S. SW. by S.

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.8	0.6	61	50.7	33.9	121	100.6	67.2	181	150.5	100.6	241	200.4	133.9
2	1.7	1.1	62	51.6	34.4	22	101.4	67.8	82	151.3	101.1	42	201.2	134.4
3	2.5	1.7	63	52.4	35.0	23	102.3	68.3	83	152.2	101.7	43	202.0	135.0
4	3.3	2.2	64	53.2	35.6	24	103.1	68.9	84	153.0	102.2	44	202.9	135.6
5	4.2	2.8	65	54.0	36.1	25	103.9	69.4	85	153.8	102.8	45	203.7	136.1
6	5.0	3.3	66	54.9	36.7	26	104.8	70.0	86	154.7	103.3	46	204.5	136.7
7	5.8	3.9	67	55.7	37.2	27	105.6	70.6	87	155.5	103.9	47	205.4	137.2
8	6.7	4.4	68	56.5	37.8	28	106.4	71.1	88	156.3	104.4	48	206.2	137.8
9	7.5	5.0	69	57.4	38.3	29	107.3	71.7	89	157.1	105.0	49	207.0	138.3
10	8.3	5.6	70	58.2	38.9	30	108.1	72.2	90	158.0	105.6	50	207.9	138.9
11	9.1	6.1	71	59.0	39.4	131	108.9	72.8	191	158.8	106.1	251	208.7	139.4
12	10.0	6.7	72	59.9	40.0	32	109.8	73.3	92	159.6	106.7	52	209.5	140.0
13	10.8	7.2	73	60.7	40.6	33	110.6	73.9	93	160.5	107.2	53	210.4	140.6
14	11.6	7.8	74	61.5	41.1	34	111.4	74.4	94	161.3	107.8	54	211.2	141.1
15	12.5	8.3	75	62.4	41.7	35	112.2	75.0	95	162.1	108.3	55	212.0	141.7
16	13.3	8.9	76	63.2	42.2	36	113.1	75.6	96	163.0	108.9	56	212.9	142.2
17	14.1	9.4	77	64.0	42.8	37	113.9	76.1	97	163.8	109.4	57	213.7	142.8
18	15.0	10.0	78	64.9	43.3	38	114.7	76.7	98	164.6	110.0	58	214.5	143.3
19	15.8	10.6	79	65.7	43.9	39	115.6	77.2	99	165.5	110.6	59	215.4	143.9
20	16.6	11.1	80	66.5	44.4	40	116.4	77.8	200	166.3	111.1	60	216.2	144.4
21	17.5	11.7	81	67.3	45.0	141	117.2	78.3	201	167.1	111.7	261	217.0	145.0
22	18.3	12.2	82	68.2	45.6	42	118.1	78.9	02	168.0	112.2	62	217.8	145.6
23	19.1	12.8	83	69.0	46.1	43	118.9	79.4	03	168.8	112.8	63	218.7	146.1
24	20.0	13.3	84	69.8	46.7	44	119.7	80.0	04	169.6	113.3	64	219.5	146.7
25	20.8	13.9	85	70.7	47.2	45	120.6	80.6	05	170.5	113.9	65	220.3	147.2
26	21.6	14.4	86	71.5	47.8	46	121.4	81.1	06	171.3	114.4	66	221.2	147.8
27	22.4	15.0	87	72.3	48.3	47	122.2	81.7	07	172.1	115.0	67	222.0	148.3
28	23.3	15.6	88	73.2	48.9	48	123.1	82.2	08	172.9	115.6	68	222.8	148.9
29	24.1	16.1	89	74.0	49.4	49	123.9	82.8	09	173.8	116.1	69	223.7	149.4
30	24.9	16.7	90	74.8	50.0	50	124.7	83.3	10	174.6	116.7	70	224.5	150.0
31	25.8	17.2	91	75.7	50.6	151	125.6	83.9	211	175.4	117.2	271	225.3	150.6
32	26.6	17.8	92	76.5	51.1	52	126.4	84.4	12	176.3	117.8	72	226.2	151.1
33	27.4	18.3	93	77.3	51.7	53	127.2	85.0	13	177.1	118.3	73	227.0	151.7
34	28.3	18.9	94	78.2	52.2	54	128.0	85.6	14	177.9	118.9	74	227.8	152.2
35	29.1	19.4	95	79.0	52.8	55	128.9	86.1	15	178.8	119.4	75	228.7	152.8
36	29.9	20.0	96	79.8	53.3	56	129.7	86.7	16	179.6	120.0	76	229.5	153.3
37	30.8	20.6	97	80.7	53.9	57	130.5	87.2	17	180.4	120.6	77	230.3	153.9
38	31.6	21.1	98	81.5	54.4	58	131.4	87.8	18	181.3	121.1	78	231.1	154.4
39	32.4	21.7	99	82.3	55.0	59	132.2	88.3	19	182.1	121.7	79	232.0	155.0
40	33.3	22.2	100	83.1	55.6	60	133.0	88.9	20	182.9	122.2	80	232.8	155.6
41	34.1	22.8	101	84.0	56.1	161	133.9	89.4	221	183.8	122.8	281	233.6	156.1
42	34.9	23.3	02	84.8	56.7	62	134.7	90.0	22	184.6	123.3	82	234.5	156.7
43	35.8	23.9	03	85.6	57.2	63	135.5	90.6	23	185.4	123.9	83	235.3	157.2
44	36.6	24.4	04	86.5	57.8	64	136.4	91.1	24	186.2	124.4	84	236.1	157.8
45	37.4	25.0	05	87.3	58.3	65	137.2	91.7	25	187.1	125.0	85	237.0	158.3
46	38.2	25.6	06	88.1	58.9	66	138.0	92.2	26	187.9	125.6	86	237.8	158.9
47	39.1	26.1	07	89.0	59.4	67	138.9	92.8	27	188.7	126.1	87	238.6	159.4
48	39.9	26.7	08	89.8	60.0	68	139.7	93.3	28	189.6	126.7	88	239.5	160.0
49	40.7	27.2	09	90.6	60.6	69	140.5	93.9	29	190.4	127.2	89	240.3	160.6
50	41.6	27.8	10	91.5	61.1	70	141.3	94.4	30	191.2	127.8	90	241.1	161.1
51	42.4	28.3	111	92.3	61.7	171	142.2	95.0	231	192.1	128.3	291	242.0	161.7
52	43.2	28.9	12	93.1	62.2	72	143.0	95.6	32	192.9	128.9	92	242.8	162.2
53	44.1	29.4	13	94.0	62.8	73	143.8	96.1	33	193.7	129.4	93	243.6	162.8
54	44.9	30.0	14	94.8	63.3	74	144.7	96.7	34	194.6	130.0	94	244.5	163.3
55	45.7	30.6	15	95.6	63.9	75	145.5	97.2	35	195.4	130.6	95	245.3	163.9
56	46.6	31.1	16	96.5	64.4	76	146.3	97.8	36	196.2	131.1	96	246.1	164.4
57	47.4	31.7	17	97.3	65.0	77	147.2	98.3	37	197.1	131.7	97	246.9	165.0
58	48.2	32.2	18	98.1	65.6	78	148.0	98.9	38	197.9	132.2	98	247.8	165.6
59	49.1	32.8	19	98.9	66.1	79	148.8	99.4	39	198.7	132.8	99	248.6	166.1
60	49.9	33.3	20	99.8	66.7	80	149.7	100.0	40	199.6	133.3	300	249.4	166.7
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

NE. by E. SE. by E. NW. by W. SW. by W. [For 5 Points.

TABLE 1.

Difference of Latitude and Departure for 3¼ Points.

NE. ¾ N.			NW. ¾ N.			SE. ¾ S.			SW. ¾ S.					
Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.8	0.6	61	49.0	36.3	121	97.2	72.1	181	145.4	107.8	241	193.6	143.6
2	1.6	1.2	62	49.8	36.9	22	98.0	72.7	82	146.2	108.4	42	194.4	144.2
3	2.4	1.8	63	50.6	37.5	23	98.8	73.3	83	147.0	109.0	43	195.2	144.8
4	3.2	2.4	64	51.4	38.1	24	99.6	73.9	84	147.8	109.6	44	196.0	145.4
5	4.0	3.0	65	52.2	38.7	25	100.4	74.5	85	148.6	110.2	45	196.8	145.9
6	4.8	3.6	66	53.0	39.3	26	101.2	75.1	86	149.4	110.8	46	197.6	146.5
7	5.6	4.2	67	53.8	39.9	27	102.0	75.7	87	150.2	111.4	47	198.4	147.1
8	6.4	4.8	68	54.6	40.5	28	102.8	76.2	88	151.0	112.0	48	199.2	147.7
9	7.2	5.4	69	55.4	41.1	29	103.6	76.8	89	151.8	112.6	49	200.0	148.3
10	8.0	6.0	70	56.2	41.7	30	104.4	77.4	90	152.6	113.2	50	200.8	148.9
11	8.8	6.6	71	57.0	42.3	131	105.2	78.0	191	153.4	113.8	251	201.6	149.5
12	9.6	7.1	72	57.8	42.9	32	106.0	78.6	92	154.2	114.4	52	202.4	150.1
13	10.4	7.7	73	58.6	43.5	33	106.8	79.2	93	155.0	115.0	53	203.2	150.7
14	11.2	8.3	74	59.4	44.1	34	107.6	79.8	94	155.8	115.6	54	204.0	151.3
15	12.0	8.9	75	60.2	44.7	35	108.4	80.4	95	156.6	116.2	55	204.8	151.9
16	12.9	9.5	76	61.0	45.3	36	109.2	81.0	96	157.4	116.8	56	205.6	152.5
17	13.7	10.1	77	61.8	45.9	37	110.0	81.6	97	158.2	117.4	57	206.4	153.1
18	14.5	10.7	78	62.7	46.5	38	110.8	82.2	98	159.0	117.9	58	207.2	153.7
19	15.3	11.3	79	63.5	47.1	39	111.6	82.8	99	159.8	118.5	59	208.0	154.3
20	16.1	11.9	80	64.3	47.7	40	112.4	83.4	200	160.6	119.1	60	208.8	154.9
21	16.9	12.5	81	65.1	48.3	141	113.3	84.0	201	161.4	119.7	261	209.6	155.5
22	17.7	13.1	82	65.9	48.8	42	114.1	84.6	02	162.2	120.3	62	210.4	156.1
23	18.5	13.7	83	66.7	49.4	43	114.9	85.2	03	163.1	120.9	63	211.2	156.7
24	19.3	14.3	84	67.5	50.0	44	115.7	85.8	04	163.9	121.5	64	212.0	157.3
25	20.1	14.9	85	68.3	50.6	45	116.5	86.4	05	164.7	122.1	65	212.8	157.9
26	20.9	15.5	86	69.1	51.2	46	117.3	87.0	06	165.5	122.7	66	213.7	158.5
27	21.7	16.1	87	69.9	51.8	47	118.1	87.6	07	166.3	123.3	67	214.5	159.1
28	22.5	16.7	88	70.7	52.4	48	118.9	88.2	08	167.1	123.9	68	215.3	159.6
29	23.3	17.3	89	71.5	53.0	49	119.7	88.8	09	167.9	124.5	69	216.1	160.2
30	24.1	17.9	90	72.3	53.6	50	120.5	89.4	10	168.7	125.1	70	216.9	160.8
31	24.9	18.5	91	73.1	54.2	151	121.3	90.0	211	169.5	125.7	271	217.7	161.4
32	25.7	19.1	92	73.9	54.8	52	122.1	90.5	12	170.3	126.3	72	218.5	162.0
33	26.5	19.7	93	74.7	55.4	53	122.9	91.1	13	171.1	126.9	73	219.3	162.6
34	27.3	20.3	94	75.5	56.0	54	123.7	91.7	14	171.9	127.5	74	220.1	163.2
35	28.1	20.8	95	76.3	56.6	55	124.5	92.3	15	172.7	128.1	75	220.9	163.8
36	28.9	21.4	96	77.1	57.2	56	125.3	92.9	16	173.5	128.7	76	221.7	164.4
37	29.7	22.0	97	77.9	57.8	57	126.1	93.5	17	174.3	129.3	77	222.5	165.0
38	30.5	22.6	98	78.7	58.4	58	126.9	94.1	18	175.1	129.9	78	223.3	165.6
39	31.3	23.2	99	79.5	59.0	59	127.7	94.7	19	175.9	130.5	79	224.1	166.2
40	32.1	23.8	100	80.3	59.6	60	128.5	95.3	20	176.7	131.1	80	224.9	166.8
41	32.9	24.4	101	81.1	60.2	161	129.3	95.9	221	177.5	131.6	281	225.7	167.4
42	33.7	25.0	02	81.9	60.8	62	130.1	96.5	22	178.3	132.2	82	226.5	168.0
43	34.5	25.6	03	82.7	61.4	63	130.9	97.1	23	179.1	132.8	83	227.3	168.6
44	35.3	26.2	04	83.5	62.0	64	131.7	97.7	24	179.9	133.4	84	228.1	169.2
45	36.1	26.8	05	84.3	62.5	65	132.5	98.3	25	180.7	134.0	85	228.9	169.8
46	36.9	27.4	06	85.1	63.1	66	133.3	98.9	26	181.5	134.6	86	229.7	170.4
47	37.8	28.0	07	85.9	63.7	67	134.1	99.5	27	182.3	135.2	87	230.5	171.0
48	38.6	28.6	08	86.7	64.3	68	134.9	100.1	28	183.1	135.8	88	231.3	171.6
49	39.4	29.2	09	87.5	64.9	69	135.7	100.7	29	183.9	136.4	89	232.1	172.2
50	40.2	29.8	10	88.4	65.5	70	136.5	101.3	30	184.7	137.0	90	232.9	172.8
51	41.0	30.4	111	89.2	66.1	171	137.3	101.9	231	185.5	137.6	291	233.7	173.3
52	41.8	31.0	12	90.0	66.7	72	138.2	102.5	32	186.3	138.2	92	234.5	173.9
53	42.6	31.6	13	90.8	67.3	73	139.0	103.1	33	187.1	138.8	93	235.3	174.5
54	43.4	32.2	14	91.6	67.9	74	139.8	103.7	34	188.0	139.4	94	236.1	175.1
55	44.2	32.8	15	92.4	68.5	75	140.6	104.2	35	188.8	140.0	95	236.9	175.7
56	45.0	33.4	16	93.2	69.1	76	141.4	104.8	36	189.6	140.6	96	237.7	176.3
57	45.8	34.0	17	94.0	69.7	77	142.2	105.4	37	190.4	141.2	97	238.6	176.9
58	46.6	34.6	18	94.8	70.3	78	143.0	106.0	38	191.2	141.8	98	239.4	177.5
59	47.4	35.1	19	95.6	70.9	79	143.8	106.6	39	192.0	142.4	99	240.2	178.1
60	48.2	35.7	20	96.4	71.5	80	144.6	107.2	40	192.8	143.0	300	241.0	178.7
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.
NE. ¾ E.			SE. ¾ E.			NW. ¾ W.			SW. ¾ W.			[For 4¾ Points.		

TABLE 1.

Difference of Latitude and Departure for 3½ Points.

NE. ½ N. NW. ½ N. SE. ½ S. SW. ½ S.

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.8	0.6	61	47.2	38.7	121	93.5	76.8	181	139.9	114.8	241	186.3	152.9
2	1.5	1.3	62	47.9	39.3	22	94.3	77.4	82	140.7	115.5	42	187.1	153.5
3	2.3	1.9	63	48.7	40.0	23	95.1	78.0	83	141.5	116.1	43	187.8	154.2
4	3.1	2.5	64	49.5	40.6	24	95.9	78.7	84	142.2	116.7	44	188.6	154.8
5	3.9	3.2	65	50.2	41.2	25	96.6	79.3	85	143.0	117.4	45	189.4	155.4
6	4.6	3.8	66	51.0	41.9	26	97.4	79.9	86	143.8	118.0	46	190.2	156.1
7	5.4	4.4	67	51.8	42.5	27	98.2	80.6	87	144.6	118.6	47	190.9	156.7
8	6.2	5.1	68	52.6	43.1	28	98.9	81.2	88	145.3	119.3	48	191.7	157.3
9	7.0	5.7	69	53.3	43.8	29	99.7	81.8	89	146.1	119.9	49	192.5	158.0
10	7.7	6.3	70	54.1	44.4	30	100.5	82.5	90	146.9	120.5	50	193.3	158.6
11	8.5	7.0	71	54.9	45.0	131	101.3	83.1	191	147.6	121.2	251	194.0	159.2
12	9.3	7.6	72	55.7	45.7	32	102.0	83.7	92	148.4	121.8	52	194.8	159.9
13	10.0	8.2	73	56.4	46.3	33	102.8	84.4	93	149.2	122.4	53	195.6	160.5
14	10.8	8.9	74	57.2	46.9	34	103.6	85.0	94	150.0	123.1	54	196.3	161.1
15	11.6	9.5	75	58.0	47.6	35	104.4	85.6	95	150.7	123.7	55	197.1	161.8
16	12.4	10.2	76	58.7	48.2	36	105.1	86.3	96	151.5	124.3	56	197.9	162.4
17	13.1	10.8	77	59.5	48.8	37	105.9	86.9	97	152.3	125.0	57	198.7	163.0
18	13.9	11.4	78	60.3	49.5	38	106.7	87.5	98	153.1	125.6	58	199.4	163.7
19	14.7	12.1	79	61.1	50.1	39	107.4	88.2	99	153.8	126.2	59	200.2	164.3
20	15.5	12.7	80	61.8	50.8	40	108.2	88.8	200	154.6	126.9	60	201.0	164.9
21	16.2	13.3	81	62.6	51.4	141	109.0	89.4	201	155.4	127.5	261	201.8	165.6
22	17.0	14.0	82	63.4	52.0	42	109.8	90.1	02	156.1	128.1	62	202.5	166.2
23	17.8	14.6	83	64.2	52.7	43	110.5	90.7	03	156.9	128.8	63	203.3	166.8
24	18.6	15.2	84	64.9	53.3	44	111.3	91.4	04	157.7	129.4	64	204.1	167.5
25	19.3	15.9	85	65.7	53.9	45	112.1	92.0	05	158.5	130.1	65	204.8	168.1
26	20.1	16.5	86	66.5	54.6	46	112.9	92.6	06	159.2	130.7	66	205.6	168.7
27	20.9	17.1	87	67.3	55.2	47	113.6	93.3	07	160.0	131.3	67	206.4	169.4
28	21.6	17.8	88	68.0	55.8	48	114.4	93.9	08	160.8	132.0	68	207.2	170.0
29	22.4	18.4	89	68.8	56.5	49	115.2	94.5	09	161.6	132.6	69	207.9	170.7
30	23.2	19.0	90	69.6	57.1	50	116.0	95.2	10	162.3	133.2	70	208.7	171.3
31	24.0	19.7	91	70.3	57.7	151	116.7	95.8	211	163.1	133.9	271	209.5	171.9
32	24.7	20.3	92	71.1	58.4	52	117.5	96.4	12	163.9	134.5	72	210.3	172.6
33	25.5	20.9	93	71.9	59.0	53	118.3	97.1	13	164.7	135.1	73	211.0	173.2
34	26.3	21.6	94	72.7	59.6	54	119.0	97.7	14	165.4	135.8	74	211.8	173.8
35	27.1	22.2	95	73.4	60.3	55	119.8	98.3	15	166.2	136.4	75	212.6	174.5
36	27.8	22.8	96	74.2	60.9	56	120.6	99.0	16	167.0	137.0	76	213.4	175.1
37	28.6	23.5	97	75.0	61.5	57	121.4	99.6	17	167.7	137.7	77	214.1	175.7
38	29.4	24.1	98	75.8	62.2	58	122.1	100.2	18	168.5	138.3	78	214.9	176.4
39	30.1	24.7	99	76.5	62.8	59	122.9	100.9	19	169.3	138.9	79	215.7	177.0
40	30.9	25.4	100	77.3	63.4	60	123.7	101.5	20	170.1	139.6	80	216.4	177.6
41	31.7	26.0	101	78.1	64.1	161	124.5	102.1	221	170.8	140.2	281	217.2	178.3
42	32.5	26.6	02	78.8	64.7	62	125.2	102.8	22	171.6	140.8	82	218.0	178.9
43	33.2	27.3	03	79.6	65.3	63	126.0	103.4	23	172.4	141.5	83	218.8	179.5
44	34.0	27.9	04	80.4	66.0	64	126.8	104.0	24	173.2	142.1	84	219.5	180.2
45	34.8	28.5	05	81.2	66.6	65	127.5	104.7	25	173.9	142.7	85	220.3	180.8
46	35.6	29.2	06	81.9	67.2	66	128.3	105.3	26	174.7	143.4	86	221.1	181.4
47	36.3	29.8	07	82.7	67.9	67	129.1	105.9	27	175.5	144.0	87	221.9	182.1
48	37.1	30.5	08	83.5	68.5	68	129.9	106.6	28	176.2	144.6	88	222.6	182.7
49	37.9	31.1	09	84.3	69.1	69	130.6	107.2	29	177.0	145.3	89	223.4	183.3
50	38.7	31.7	10	85.0	69.8	70	131.4	107.8	30	177.8	145.9	90	224.2	184.0
51	39.4	32.4	111	85.8	70.4	171	132.2	108.5	231	178.6	146.5	291	224.9	184.6
52	40.2	33.0	12	86.6	71.1	72	133.0	109.1	32	179.3	147.2	92	225.7	185.2
53	41.0	33.6	13	87.4	71.7	73	133.7	109.8	33	180.1	147.8	93	226.5	185.9
54	41.7	34.3	14	88.1	72.3	74	134.5	110.4	34	180.9	148.4	94	227.3	186.5
55	42.5	34.9	15	88.9	73.0	75	135.3	111.0	35	181.7	149.1	95	228.0	187.1
56	43.3	35.5	16	89.7	73.6	76	136.0	111.7	36	182.4	149.7	96	228.8	187.8
57	44.1	36.2	17	90.4	74.2	77	136.8	112.3	37	183.2	150.4	97	229.6	188.4
58	44.8	36.8	18	91.2	74.9	78	137.6	112.9	38	184.0	151.0	98	230.4	189.0
59	45.6	37.4	19	92.0	75.5	79	138.4	113.6	39	184.7	151.6	99	231.1	189.7
60	46.4	38.1	20	92.8	76.1	80	139.1	114.2	40	185.5	152.3	300	231.9	190.3
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

NE. ½ E. SE. ½ E. NW. ½ W. SW. ½ W. [For 4½ Points.

TABLE 1.

Difference of Latitude and Departure for 3¾ Points.

NE. ¼ N. NW. ¼ N. SE. ¼ S. SW. ¼ S.

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.7	0.7	61	45.2	41.0	121	89.7	81.3	181	134.1	121.6	241	178.6	161.8
2	1.5	1.3	62	45.9	41.6	22	90.4	81.9	82	134.9	122.2	42	179.3	162.5
3	2.2	2.0	63	46.7	42.3	23	91.1	82.6	83	135.6	122.9	43	180.1	163.2
4	3.0	2.7	64	47.4	43.0	24	91.9	83.3	84	136.3	123.6	44	180.8	163.9
5	3.7	3.4	65	48.2	43.7	25	92.6	83.9	85	137.1	124.2	45	181.5	164.5
6	4.4	4.0	66	48.9	44.3	26	93.4	84.6	86	137.8	124.9	46	182.3	165.2
7	5.2	4.7	67	49.6	45.0	27	94.1	85.3	87	138.6	125.6	47	183.0	165.9
8	5.9	5.4	68	50.4	45.7	28	94.8	86.0	88	139.3	126.3	48	183.8	166.5
9	6.7	6.0	69	51.1	46.3	29	95.6	86.6	89	140.0	126.9	49	184.5	167.2
10	7.4	6.7	70	51.9	47.0	30	96.3	87.3	90	140.8	127.6	50	185.2	167.9
11	8.2	7.4	71	52.6	47.7	131	97.1	88.0	191	141.5	128.3	251	186.0	168.6
12	8.9	8.1	72	53.3	48.4	32	97.8	88.6	92	142.8	128.9	52	186.7	169.2
13	9.6	8.7	73	54.1	49.0	33	98.5	89.3	93	143.0	129.6	53	187.5	169.9
14	10.4	9.4	74	54.8	49.7	34	99.3	90.0	94	143.7	130.3	54	188.2	170.6
15	11.1	10.1	75	55.6	50.4	35	100.0	90.7	95	144.5	131.0	55	188.9	171.2
16	11.9	10.7	76	56.3	51.0	36	100.8	91.3	96	145.2	131.6	56	189.7	171.9
17	12.6	11.4	77	57.1	51.7	37	101.5	92.0	97	146.0	132.3	57	190.4	172.6
18	13.3	12.1	78	57.8	52.4	38	102.3	92.7	98	146.7	133.0	58	191.2	173.3
19	14.1	12.8	79	58.5	53.1	39	103.0	93.3	99	147.4	133.6	59	191.9	173.9
20	14.8	13.4	80	59.3	53.7	40	103.7	94.0	200	148.2	134.3	60	192.6	174.6
21	15.6	14.1	81	60.0	54.4	141	104.5	94.7	201	148.9	135.0	261	193.4	175.3
22	16.3	14.8	82	60.8	55.1	42	105.2	95.4	02	149.7	135.7	62	194.1	175.9
23	17.0	15.4	83	61.5	55.7	43	106.0	96.0	03	150.4	136.3	63	194.9	176.6
24	17.8	16.1	84	62.2	56.4	44	106.7	96.7	04	151.2	137.0	64	195.6	177.3
25	18.5	16.8	85	63.0	57.1	45	107.4	97.4	05	151.9	137.7	65	196.4	178.0
26	19.3	17.5	86	63.7	57.8	46	108.2	98.0	06	152.6	138.3	66	197.1	178.6
27	20.0	18.1	87	64.5	58.4	47	108.9	98.7	07	153.4	139.0	67	197.8	179.3
28	20.7	18.8	88	65.2	59.1	48	109.7	99.4	08	154.1	139.7	68	198.6	180.0
29	21.5	19.5	89	65.9	59.8	49	110.4	100.1	09	154.9	140.4	69	199.3	180.6
30	22.2	20.1	90	66.7	60.4	50	111.1	100.7	10	155.6	141.0	70	200.1	181.3
31	23.0	20.8	91	67.4	61.1	151	111.9	101.4	211	156.3	141.7	271	200.8	182.0
32	23.7	21.5	92	68.2	61.8	52	112.6	102.1	12	157.1	142.4	72	201.5	182.7
33	24.5	22.2	93	68.9	62.5	53	113.4	102.7	13	157.8	143.0	73	202.3	183.3
34	25.2	22.8	94	69.6	63.1	54	114.1	103.4	14	158.6	143.7	74	203.0	184.0
35	25.9	23.5	95	70.4	63.8	55	114.8	104.1	15	159.3	144.4	75	203.8	184.7
36	26.7	24.2	96	71.1	64.5	56	115.6	104.8	16	160.0	145.1	76	204.5	185.4
37	27.4	24.8	97	71.9	65.1	57	116.3	105.4	17	160.8	145.7	77	205.2	186.0
38	28.2	25.5	98	72.6	65.8	58	117.1	106.1	18	161.5	146.4	78	206.0	186.7
39	28.9	26.2	99	73.4	66.5	59	117.8	106.8	19	162.3	147.1	79	206.7	187.4
40	29.6	26.9	100	74.1	67.2	60	118.6	107.4	20	163.0	147.7	80	207.5	188.0
41	30.4	27.5	101	74.8	67.8	161	119.3	108.1	221	163.8	148.4	281	208.2	188.7
42	31.1	28.2	02	75.6	68.5	62	120.0	108.8	22	164.5	149.1	82	208.9	189.4
43	31.9	28.9	03	76.3	69.2	63	120.8	109.5	23	165.2	149.8	83	209.7	190.1
44	32.6	29.5	04	77.1	69.8	64	121.5	110.1	24	166.0	150.4	84	210.4	190.7
45	33.3	30.2	05	77.8	70.5	65	122.3	110.8	25	166.7	151.1	85	211.2	191.4
46	34.1	30.9	06	78.5	71.2	66	123.0	111.5	26	167.5	151.8	86	211.9	192.1
47	34.8	31.6	07	79.3	71.9	67	123.7	112.2	27	168.2	152.4	87	212.7	192.7
48	35.6	32.2	08	80.0	72.5	68	124.5	112.8	28	168.9	153.1	88	213.4	193.4
49	36.3	32.9	09	80.8	73.2	69	125.2	113.5	29	169.7	153.8	89	214.1	194.1
50	37.0	33.6	10	81.5	73.9	70	126.0	114.2	30	170.4	154.5	90	214.9	194.8
51	37.8	34.2	111	82.2	74.5	171	126.7	114.8	231	171.2	155.1	291	215.6	195.4
52	38.5	34.9	12	83.0	75.2	72	127.4	115.5	32	171.9	155.8	92	216.4	196.1
53	39.3	35.6	13	83.7	75.9	73	128.2	116.2	33	172.6	156.5	93	217.1	196.8
54	40.0	36.3	14	84.5	76.6	74	128.9	116.9	34	173.4	157.1	94	217.8	197.4
55	40.8	36.9	15	85.2	77.2	75	129.7	117.5	35	174.1	157.8	95	218.6	198.1
56	41.5	37.6	16	86.0	77.9	76	130.4	118.2	36	174.9	158.5	96	219.3	198.8
57	42.2	38.3	17	86.7	78.6	77	131.1	118.9	37	175.6	159.2	97	220.1	199.5
58	43.0	39.0	18	87.4	79.2	78	131.9	119.5	38	176.3	159.8	98	220.8	200.1
59	43.7	39.6	19	88.2	79.9	79	132.6	120.2	39	177.1	160.5	99	221.5	200.8
60	44.5	40.3	20	88.9	80.6	80	133.4	120.9	40	177.8	161.2	300	222.3	201.5
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

NE. ¼ E. SE. ¼ E. NW. ¼ W. SW. ¼ W. [For 4¼ Points.

TABLE 1.

Difference of Latitude and Departure for 4 Points.

NE. NW. SE. SW.

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.7	0.7	61	43.1	43.1	121	85.6	85.6	181	128.0	128.0	241	170.4	170.4
2	1.4	1.4	62	43.8	43.8	22	86.3	86.3	82	128.7	128.7	42	171.1	171.1
3	2.1	2.1	63	44.5	44.5	23	87.0	87.0	83	129.4	129.4	43	171.8	171.8
4	2.8	2.8	64	45.3	45.3	24	87.7	87.7	84	130.1	130.1	44	172.5	172.5
5	3.5	3.5	65	46.0	46.0	25	88.4	88.4	85	130.8	130.8	45	173.2	173.2
6	4.2	4.2	66	46.7	46.7	26	89.1	89.1	86	131.5	131.5	46	173.9	173.9
7	4.9	4.9	67	47.4	47.4	27	89.8	89.8	87	132.2	132.2	47	174.7	174.7
8	5.7	5.7	68	48.1	48.1	28	90.5	90.5	88	132.9	132.9	48	175.4	175.4
9	6.4	6.4	69	48.8	48.8	29	91.2	91.2	89	133.6	133.6	49	176.1	176.1
10	7.1	7.1	70	49.5	49.5	30	91.9	91.9	90	134.4	134.4	50	176.8	176.8
11	7.8	7.8	71	50.2	50.2	131	92.6	92.6	191	135.1	135.1	251	177.5	177.5
12	8.5	8.5	72	50.9	50.9	32	93.3	93.3	92	135.8	135.8	52	178.2	178.2
13	9.2	9.2	73	51.6	51.6	33	94.0	94.0	93	136.5	136.5	53	178.9	178.9
14	9.9	9.9	74	52.3	52.3	34	94.8	94.8	94	137.2	137.2	54	179.6	179.6
15	10.6	10.6	75	53.0	53.0	35	95.5	95.5	95	137.9	137.9	55	180.3	180.3
16	11.3	11.3	76	53.7	53.7	36	96.2	96.2	96	138.6	138.6	56	181.0	181.0
17	12.0	12.0	77	54.4	54.4	37	96.9	96.9	97	139.3	139.3	57	181.7	181.7
18	12.7	12.7	78	55.2	55.2	38	97.6	97.6	98	140.0	140.0	58	182.4	182.4
19	13.4	13.4	79	55.9	55.9	39	98.3	98.3	99	140.7	140.7	59	183.1	183.1
20	14.1	14.1	80	56.6	56.6	40	99.0	99.0	200	141.4	141.4	60	183.8	183.8
21	14.8	14.8	81	57.3	57.3	141	99.7	99.7	201	142.1	142.1	261	184.6	184.6
22	15.6	15.6	82	58.0	58.0	42	100.4	100.4	02	142.8	142.8	62	185.3	185.3
23	16.3	16.3	83	58.7	58.7	43	101.1	101.1	03	143.5	143.5	63	186.0	186.0
24	17.0	17.0	84	59.4	59.4	44	101.8	101.8	04	144.2	144.2	64	186.7	186.7
25	17.7	17.7	85	60.1	60.1	45	102.5	102.5	05	145.0	145.0	65	187.4	187.4
26	18.4	18.4	86	60.8	60.8	46	103.2	103.2	06	145.7	145.7	66	188.1	188.1
27	19.1	19.1	87	61.5	61.5	47	103.9	103.9	07	146.4	146.4	67	188.8	188.8
28	19.8	19.8	88	62.2	62.2	48	104.7	104.7	08	147.1	147.1	68	189.5	189.5
29	20.5	20.5	89	62.9	62.9	49	105.4	105.4	09	147.8	147.8	69	190.2	190.2
30	21.2	21.2	90	63.6	63.6	50	106.1	106.1	10	148.5	148.5	70	190.9	190.9
31	21.9	21.9	91	64.3	64.3	151	106.8	106.8	211	149.2	149.2	271	191.6	191.6
32	22.6	22.6	92	65.1	65.1	52	107.5	107.5	12	149.9	149.9	72	192.3	192.3
33	23.3	23.3	93	65.8	65.8	53	108.2	108.2	13	150.6	150.6	73	193.0	193.0
34	24.0	24.0	94	66.5	66.5	54	108.9	108.9	14	151.3	151.3	74	193.7	193.7
35	24.7	24.7	95	67.2	67.2	55	109.6	109.6	15	152.0	152.0	75	194.5	194.5
36	25.5	25.5	96	67.9	67.9	56	110.3	110.3	16	152.7	152.7	76	195.2	195.2
37	26.2	26.2	97	68.6	68.6	57	111.0	111.0	17	153.4	153.4	77	195.9	195.9
38	26.9	26.9	98	69.3	69.3	58	111.7	111.7	18	154.1	154.1	78	196.6	196.6
39	27.6	27.6	99	70.0	70.0	59	112.4	112.4	19	154.9	154.9	79	197.3	197.3
40	28.3	28.3	100	70.7	70.7	60	113.1	113.1	20	155.6	155.6	80	198.0	198.0
41	29.0	29.0	101	71.4	71.4	161	113.8	113.8	221	156.3	156.3	281	198.7	198.7
42	29.7	29.7	02	72.1	72.1	62	114.6	114.6	22	157.0	157.0	82	199.4	199.4
43	30.4	30.4	03	72.8	72.8	63	115.3	115.3	23	157.7	157.7	83	200.1	200.1
44	31.1	31.1	04	73.5	73.5	64	116.0	116.0	24	158.4	158.4	84	200.8	200.8
45	31.8	31.8	05	74.2	74.2	65	116.7	116.7	25	159.1	159.1	85	201.5	201.5
46	32.5	32.5	06	75.0	75.0	66	117.4	117.4	26	159.8	159.8	86	202.2	202.2
47	33.2	33.2	07	75.7	75.7	67	118.1	118.1	27	160.5	160.5	87	202.9	202.9
48	33.9	33.9	08	76.4	76.4	68	118.8	118.8	28	161.2	161.2	88	203.6	203.6
49	34.6	34.6	09	77.1	77.1	69	119.5	119.5	29	161.9	161.9	89	204.4	204.4
50	35.4	35.4	10	77.8	77.8	70	120.2	120.2	30	162.6	162.6	90	205.1	205.1
51	36.1	36.1	111	78.5	78.5	171	120.9	120.9	231	163.3	163.3	291	205.8	205.8
52	36.8	36.8	12	79.2	79.2	72	121.6	121.6	32	164.0	164.0	92	206.5	206.5
53	37.5	37.5	13	79.9	79.9	73	122.3	122.3	33	164.8	164.8	93	207.2	207.2
54	38.2	38.2	14	80.6	80.6	74	123.0	123.0	34	165.5	165.5	94	207.9	207.9
55	38.9	38.9	15	81.3	81.3	75	123.7	123.7	35	166.2	166.2	95	208.6	208.6
56	39.6	39.6	16	82.0	82.0	76	124.5	124.5	36	166.9	166.9	96	209.3	209.3
57	40.3	40.3	17	82.7	82.7	77	125.2	125.2	37	167.6	167.6	97	210.0	210.0
58	41.0	41.0	18	83.4	83.4	78	125.9	125.9	38	168.3	168.3	98	210.7	210.7
59	41.7	41.7	19	84.1	84.1	79	126.6	126.6	39	169.0	169.0	99	211.4	211.4
60	42.4	42.4	20	84.9	84.9	80	127.3	127.3	40	169.7	169.7	300	212.1	212.1
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

NE. NW. SE. SW. [For 4 Points.

TABLE 2.

Difference of Latitude and Departure for 1° (179°, 181°, 359°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.0	61	61.0	1.1	121	121.0	2.1	181	181.0	3.2	241	241.0	4.2
2	2.0	0.0	62	62.0	1.1	22	122.0	2.1	82	182.0	3.2	42	242.0	4.2
3	3.0	0.1	63	63.0	1.1	23	123.0	2.1	83	183.0	3.2	43	243.0	4.2
4	4.0	0.1	64	64.0	1.1	24	124.0	2.2	84	184.0	3.2	44	244.0	4.3
5	5.0	0.1	65	65.0	1.1	25	125.0	2.2	85	185.0	3.2	45	245.0	4.3
6	6.0	0.1	66	66.0	1.2	26	126.0	2.2	86	186.0	3.2	46	246.0	4.3
7	7.0	0.1	67	67.0	1.2	27	127.0	2.2	87	187.0	3.3	47	247.0	4.3
8	8.0	0.1	68	68.0	1.2	28	128.0	2.2	88	188.0	3.3	48	248.0	4.3
9	9.0	0.2	69	69.0	1.2	29	129.0	2.3	89	189.0	3.3	49	249.0	4.3
10	10.0	0.2	70	70.0	1.2	30	130.0	2.3	90	190.0	3.3	50	250.0	4.4
11	11.0	0.2	71	71.0	1.2	131	131.0	2.3	191	191.0	3.3	251	251.0	4.4
12	12.0	0.2	72	72.0	1.3	32	132.0	2.3	92	192.0	3.4	52	252.0	4.4
13	13.0	0.2	73	73.0	1.3	33	133.0	2.3	93	193.0	3.4	53	253.0	4.4
14	14.0	0.2	74	74.0	1.3	34	134.0	2.3	94	194.0	3.4	54	254.0	4.4
15	15.0	0.3	75	75.0	1.3	35	135.0	2.4	95	195.0	3.4	55	255.0	4.5
16	16.0	0.3	76	76.0	1.3	36	136.0	2.4	96	196.0	3.4	56	256.0	4.5
17	17.0	0.3	77	77.0	1.3	37	137.0	2.4	97	197.0	3.4	57	257.0	4.5
18	18.0	0.3	78	78.0	1.4	38	138.0	2.4	98	198.0	3.5	58	258.0	4.5
19	19.0	0.3	79	79.0	1.4	39	139.0	2.4	99	199.0	3.5	59	259.0	4.5
20	20.0	0.3	80	80.0	1.4	40	140.0	2.4	200	200.0	3.5	60	260.0	4.5
21	21.0	0.4	81	81.0	1.4	141	141.0	2.5	201	201.0	3.5	261	261.0	4.6
22	22.0	0.4	82	82.0	1.4	42	142.0	2.5	02	202.0	3.5	62	262.0	4.6
23	23.0	0.4	83	83.0	1.4	43	143.0	2.5	03	203.0	3.5	63	263.0	4.6
24	24.0	0.4	84	84.0	1.5	44	144.0	2.5	04	204.0	3.6	64	264.0	4.6
25	25.0	0.4	85	85.0	1.5	45	145.0	2.5	05	205.0	3.6	65	265.0	4.6
26	26.0	0.5	86	86.0	1.5	46	146.0	2.5	06	206.0	3.6	66	266.0	4.6
27	27.0	0.5	87	87.0	1.5	47	147.0	2.6	07	207.0	3.6	67	267.0	4.7
28	28.0	0.5	88	88.0	1.5	48	148.0	2.6	08	208.0	3.6	68	268.0	4.7
29	29.0	0.5	89	89.0	1.6	49	149.0	2.6	09	209.0	3.6	69	269.0	4.7
30	30.0	0.5	90	90.0	1.6	50	150.0	2.6	10	210.0	3.7	70	270.0	4.7
31	31.0	0.5	91	91.0	1.6	151	151.0	2.6	211	211.0	3.7	271	271.0	4.7
32	32.0	0.6	92	92.0	1.6	52	152.0	2.7	12	212.0	3.7	72	272.0	4.7
33	33.0	0.6	93	93.0	1.6	53	153.0	2.7	13	213.0	3.7	73	273.0	4.8
34	34.0	0.6	94	94.0	1.6	54	154.0	2.7	14	214.0	3.7	74	274.0	4.8
35	35.0	0.6	95	95.0	1.7	55	155.0	2.7	15	215.0	3.8	75	275.0	4.8
36	36.0	0.6	96	96.0	1.7	56	156.0	2.7	16	216.0	3.8	76	276.0	4.8
37	37.0	0.6	97	97.0	1.7	57	157.0	2.7	17	217.0	3.8	77	277.0	4.8
38	38.0	0.7	98	98.0	1.7	58	158.0	2.8	18	218.0	3.8	78	278.0	4.9
39	39.0	0.7	99	99.0	1.7	59	159.0	2.8	19	219.0	3.8	79	279.0	4.9
40	40.0	0.7	100	100.0	1.7	60	160.0	2.8	20	220.0	3.8	80	280.0	4.9
41	41.0	0.7	101	101.0	1.8	161	161.0	2.8	221	221.0	3.9	281	281.0	4.9
42	42.0	0.7	02	102.0	1.8	62	162.0	2.8	22	222.0	3.9	82	282.0	4.9
43	43.0	0.8	03	103.0	1.8	63	163.0	2.8	23	223.0	3.9	83	283.0	4.9
44	44.0	0.8	04	104.0	1.8	64	164.0	2.9	24	224.0	3.9	84	284.0	5.0
45	45.0	0.8	05	105.0	1.8	65	165.0	2.9	25	225.0	3.9	85	285.0	5.0
46	46.0	0.8	06	106.0	1.8	66	166.0	2.9	26	226.0	3.9	86	286.0	5.0
47	47.0	0.8	07	107.0	1.9	67	167.0	2.9	27	227.0	4.0	87	287.0	5.0
48	48.0	0.8	08	108.0	1.9	68	168.0	2.9	28	228.0	4.0	88	288.0	5.0
49	49.0	0.9	09	109.0	1.9	69	169.0	2.9	29	229.0	4.0	89	289.0	5.0
50	50.0	0.9	10	110.0	1.9	70	170.0	3.0	30	230.0	4.0	90	290.0	5.1
51	51.0	0.9	111	111.0	1.9	171	171.0	3.0	231	231.0	4.0	291	291.0	5.1
52	52.0	0.9	12	112.0	2.0	72	172.0	3.0	32	232.0	4.0	92	292.0	5.1
53	53.0	0.9	13	113.0	2.0	73	173.0	3.0	33	233.0	4.1	93	293.0	5.1
54	54.0	0.9	14	114.0	2.0	74	174.0	3.0	34	234.0	4.1	94	294.0	5.1
55	55.0	1.0	15	115.0	2.0	75	175.0	3.1	35	235.0	4.1	95	295.0	5.1
56	56.0	1.0	16	116.0	2.0	76	176.0	3.1	36	236.0	4.1	96	296.0	5.2
57	57.0	1.0	17	117.0	2.0	77	177.0	3.1	37	237.0	4.1	97	297.0	5.2
58	58.0	1.0	18	118.0	2.1	78	178.0	3.1	38	238.0	4.2	98	298.0	5.2
59	59.0	1.0	19	119.0	2.1	79	179.0	3.1	39	239.0	4.2	99	299.0	5.2
60	60.0	1.0	20	120.0	2.1	80	180.0	3.1	40	240.0	4.2	300	300.0	5.2
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

89° (91°, 269°, 271°).

TABLE 2.

Difference of Latitude and Departure for 1° (179°, 181°, 359°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	301.0	5.3	361	360.9	6.3	421	420.9	7.3	481	480.9	8.4	541	540.9	9.5
02	302.0	5.3	62	361.9	6.3	22	421.9	7.4	82	481.9	8.4	42	541.9	9.5
03	303.0	5.3	63	362.9	6.3	23	422.9	7.4	83	482.9	8.5	43	542.9	9.5
04	304.0	5.3	64	363.9	6.4	24	423.9	7.4	84	483.9	8.5	44	543.9	9.5
05	305.0	5.3	65	364.9	6.4	25	424.9	7.4	85	484.9	8.5	45	544.9	9.5
06	306.0	5.3	66	365.9	6.4	26	425.9	7.4	86	485.9	8.5	46	545.9	9.5
07	307.0	5.4	67	366.9	6.4	27	426.9	7.4	87	486.9	8.5	47	546.9	9.6
08	308.0	5.4	68	367.9	6.4	28	427.9	7.5	88	487.9	8.6	48	547.9	9.6
09	309.0	5.4	69	368.9	6.4	29	428.9	7.5	89	488.9	8.6	49	548.9	9.6
10	310.0	5.4	70	369.9	6.5	30	429.9	7.5	90	489.9	8.6	50	549.9	9.6
311	311.0	5.4	371	370.9	6.5	431	430.9	7.5	491	490.9	8.6	551	550.9	9.6
12	312.0	5.4	72	371.9	6.5	32	431.9	7.5	92	491.9	8.6	52	551.9	9.6
13	313.0	5.5	73	372.9	6.5	33	432.9	7.5	93	492.9	8.7	53	552.9	9.7
14	314.0	5.5	74	373.9	6.5	34	433.9	7.6	94	493.9	8.7	54	553.9	9.7
15	315.0	5.5	75	374.9	6.5	35	434.9	7.6	95	494.9	8.7	55	554.9	9.7
16	316.0	5.5	76	375.9	6.6	36	435.9	7.6	96	495.9	8.7	56	555.9	9.7
17	317.0	5.5	77	376.9	6.6	37	436.9	7.6	97	496.9	8.7	57	556.9	9.7
18	318.0	5.5	78	377.9	6.6	38	437.9	7.6	98	497.9	8.7	58	557.9	9.7
19	319.0	5.6	79	378.9	6.6	39	438.9	7.7	99	498.9	8.8	59	558.9	9.8
20	320.0	5.6	80	379.9	6.6	40	439.9	7.7	500	499.9	8.8	60	559.9	9.8
321	321.0	5.6	381	380.9	6.7	441	440.9	7.7	501	500.9	8.8	561	560.9	9.8
22	322.0	5.6	82	381.9	6.7	42	441.9	7.7	02	501.9	8.8	62	561.9	9.8
23	323.0	5.6	83	382.9	6.7	43	442.9	7.7	03	502.9	8.8	63	562.9	9.8
24	324.0	5.6	84	383.9	6.7	44	443.9	7.7	04	503.9	8.8	64	563.9	9.8
25	325.0	5.7	85	384.9	6.7	45	444.9	7.8	05	504.9	8.8	65	564.9	9.9
26	326.0	5.7	86	385.9	6.7	46	445.9	7.8	06	505.9	8.9	66	565.9	9.9
27	327.0	5.7	87	386.9	6.8	47	446.9	7.8	07	506.9	8.9	67	566.9	9.9
28	328.0	5.7	88	387.9	6.8	48	447.9	7.8	08	507.9	8.9	68	567.9	9.9
29	329.0	5.7	89	388.9	6.8	49	448.9	7.8	09	508.9	8.9	69	568.9	9.9
30	330.0	5.8	90	389.9	6.8	50	449.9	7.8	10	509.9	8.9	70	569.9	9.9
331	331.0	5.8	391	390.9	6.8	451	450.9	7.9	511	510.9	9.0	571	570.9	10.0
32	332.0	5.8	92	391.9	6.8	52	451.9	7.9	12	511.9	9.0	72	571.9	10.0
33	333.0	5.8	93	392.9	6.9	53	452.9	7.9	13	512.9	9.0	73	572.9	10.0
34	333.9	5.8	94	393.9	6.9	54	453.9	7.9	14	513.9	9.0	74	573.9	10.0
35	334.9	5.8	95	394.9	6.9	55	454.9	7.9	15	514.9	9.0	75	574.9	10.0
36	335.9	5.9	96	395.9	6.9	56	455.9	8.0	16	515.9	9.0	76	575.9	10.0
37	336.9	5.9	97	396.9	6.9	57	456.9	8.0	17	516.9	9.1	77	576.9	10.1
38	337.9	5.9	98	397.9	6.9	58	457.9	8.0	18	517.9	9.1	78	577.9	10.1
39	338.9	5.9	99	398.9	7.0	59	458.9	8.0	19	518.9	9.1	79	578.9	10.1
40	339.9	5.9	400	399.9	7.0	60	459.9	8.0	20	519.9	9.1	80	579.9	10.1
341	340.9	6.0	401	400.9	7.0	461	460.9	8.0	521	520.9	9.1	581	580.9	10.1
42	341.9	6.0	02	401.9	7.0	62	461.9	8.1	22	521.9	9.1	82	581.9	10.1
43	342.9	6.0	03	402.9	7.0	63	462.9	8.1	23	522.9	9.2	83	582.9	10.2
44	343.9	6.0	04	403.9	7.1	64	463.9	8.1	24	523.9	9.2	84	583.9	10.2
45	344.9	6.0	05	404.9	7.1	65	464.9	8.1	25	524.9	9.2	85	584.9	10.2
46	345.9	6.0	06	405.9	7.1	66	465.9	8.1	26	525.9	9.2	86	585.9	10.2
47	346.9	6.1	07	406.9	7.1	67	466.9	8.1	27	526.9	9.2	87	586.9	10.2
48	347.9	6.1	08	407.9	7.1	68	467.9	8.2	28	527.9	9.2	88	587.9	10.2
49	348.9	6.1	09	408.9	7.1	69	468.9	8.2	29	528.9	9.3	89	588.9	10.3
50	349.9	6.1	10	409.9	7.2	70	469.9	8.2	30	529.9	9.3	90	589.9	10.3
351	350.9	6.1	411	410.9	7.2	471	470.9	8.2	531	530.9	9.3	591	590.9	10.3
52	351.9	6.1	12	411.9	7.2	72	471.9	8.2	32	531.9	9.3	92	591.9	10.3
53	352.9	6.2	13	412.9	7.2	73	472.9	8.2	33	532.9	9.3	93	592.9	10.3
54	353.9	6.2	14	413.9	7.2	74	473.9	8.3	34	533.9	9.3	94	593.9	10.3
55	354.9	6.2	15	414.9	7.2	75	474.9	8.3	35	534.9	9.4	95	594.9	10.4
56	355.9	6.2	16	415.9	7.3	76	475.9	8.3	36	535.9	9.4	96	595.9	10.4
57	356.9	6.2	17	416.9	7.3	77	476.9	8.3	37	536.9	9.4	97	596.9	10.4
58	357.9	6.2	18	417.9	7.3	78	477.9	8.3	38	537.9	9.4	98	597.9	10.4
59	358.9	6.3	19	418.9	7.3	79	478.9	8.4	39	538.9	9.4	99	598.9	10.4
60	359.9	6.3	20	419.9	7.3	80	479.9	8.4	40	539.9	9.4	600	599.9	10.5
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

89° (91°, 269°, 271°).

TABLE 2.

Difference of Latitude and Departure for 2° (178°, 182°, 358°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.0	61	61.0	2.1	121	120.9	4.2	181	180.9	6.3	241	240.9	8.4
2	2.0	0.1	62	62.0	2.2	22	121.9	4.3	82	181.9	6.4	42	241.9	8.4
3	3.0	0.1	63	63.0	2.2	23	122.9	4.3	83	182.9	6.4	43	242.9	8.5
4	4.0	0.1	64	64.0	2.2	24	123.9	4.3	84	183.9	6.4	44	243.9	8.5
5	5.0	0.2	65	65.0	2.3	25	124.9	4.4	85	184.9	6.5	45	244.9	8.6
6	6.0	0.2	66	66.0	2.3	26	125.9	4.4	86	185.9	6.5	46	245.9	8.6
7	7.0	0.2	67	67.0	2.3	27	126.9	4.4	87	186.9	6.5	47	246.8	8.6
8	8.0	0.3	68	68.0	2.4	28	127.9	4.5	88	187.9	6.6	48	247.8	8.7
9	9.0	0.3	69	69.0	2.4	29	128.9	4.5	89	188.9	6.6	49	248.8	8.7
10	10.0	0.3	70	70.0	2.4	30	129.9	4.5	90	189.9	6.6	50	249.8	8.7
11	11.0	0.4	71	71.0	2.5	131	130.9	4.6	191	190.9	6.7	251	250.8	8.8
12	12.0	0.4	72	72.0	2.5	32	131.9	4.6	92	191.9	6.7	52	251.8	8.8
13	13.0	0.5	73	73.0	2.5	33	132.9	4.6	93	192.9	6.7	53	252.8	8.8
14	14.0	0.5	74	74.0	2.6	34	133.9	4.7	94	193.9	6.8	54	253.8	8.9
15	15.0	0.5	75	75.0	2.6	35	134.9	4.7	95	194.9	6.8	55	254.8	8.9
16	16.0	0.6	76	76.0	2.7	36	135.9	4.7	96	195.9	6.8	56	255.8	8.9
17	17.0	0.6	77	77.0	2.7	37	136.9	4.8	97	196.9	6.9	57	256.8	9.0
18	18.0	0.6	78	78.0	2.7	38	137.9	4.8	98	197.9	6.9	58	257.8	9.0
19	19.0	0.7	79	79.0	2.8	39	138.9	4.9	99	198.9	6.9	59	258.8	9.0
20	20.0	0.7	80	80.0	2.8	40	139.9	4.9	200	199.9	7.0	60	259.8	9.1
21	21.0	0.7	81	81.0	2.8	141	140.9	4.9	201	200.9	7.0	261	260.8	9.1
22	22.0	0.8	82	82.0	2.9	42	141.9	5.0	02	201.9	7.0	62	261.8	9.1
23	23.0	0.8	83	82.9	2.9	43	142.9	5.0	03	202.9	7.1	63	262.8	9.2
24	24.0	0.8	84	83.9	2.9	44	143.9	5.0	04	203.9	7.1	64	263.8	9.2
25	25.0	0.9	85	84.9	3.0	45	144.9	5.1	05	204.9	7.2	65	264.8	9.2
26	26.0	0.9	86	85.9	3.0	46	145.9	5.1	06	205.9	7.2	66	265.8	9.3
27	27.0	0.9	87	86.9	3.0	47	146.9	5.1	07	206.9	7.2	67	266.8	9.3
28	28.0	1.0	88	87.9	3.1	48	147.9	5.2	08	207.9	7.3	68	267.8	9.4
29	29.0	1.0	89	88.9	3.1	49	148.9	5.2	09	208.9	7.3	69	268.8	9.4
30	30.0	1.0	90	89.9	3.1	50	149.9	5.2	10	209.9	7.3	70	269.8	9.4
31	31.0	1.1	91	90.9	3.2	151	150.9	5.3	211	210.9	7.4	271	270.8	9.5
32	32.0	1.1	92	91.9	3.2	52	151.9	5.3	12	211.9	7.4	72	271.8	9.5
33	33.0	1.2	93	92.9	3.2	53	152.9	5.3	13	212.9	7.4	73	272.8	9.5
34	34.0	1.2	94	93.9	3.3	54	153.9	5.4	14	213.9	7.5	74	273.8	9.6
35	35.0	1.2	95	94.9	3.3	55	154.9	5.4	15	214.9	7.5	75	274.8	9.6
36	36.0	1.3	96	95.9	3.4	56	155.9	5.4	16	215.9	7.5	76	275.8	9.6
37	37.0	1.3	97	96.9	3.4	57	156.9	5.5	17	216.9	7.6	77	276.8	9.7
38	38.0	1.3	98	97.9	3.4	58	157.9	5.5	18	217.9	7.6	78	277.8	9.7
39	39.0	1.4	99	98.9	3.5	59	158.9	5.5	19	218.9	7.6	79	278.8	9.7
40	40.0	1.4	100	99.9	3.5	60	159.9	5.6	20	219.9	7.7	80	279.8	9.8
41	41.0	1.4	101	100.9	3.5	161	160.9	5.6	221	220.9	7.7	281	280.8	9.8
42	42.0	1.5	02	101.9	3.6	62	161.9	5.7	22	221.9	7.7	82	281.8	9.8
43	43.0	1.5	03	102.9	3.6	63	162.9	5.7	23	222.9	7.8	83	282.8	9.9
44	44.0	1.5	04	103.9	3.6	64	163.9	5.7	24	223.9	7.8	84	283.8	9.9
45	45.0	1.6	05	104.9	3.7	65	164.9	5.8	25	224.9	7.9	85	284.8	9.9
46	46.0	1.6	06	105.9	3.7	66	165.9	5.8	26	225.9	7.9	86	285.8	10.0
47	47.0	1.6	07	106.9	3.7	67	166.9	5.8	27	226.9	7.9	87	286.8	10.0
48	48.0	1.7	08	107.9	3.8	68	167.9	5.9	28	227.9	8.0	88	287.8	10.1
49	49.0	1.7	09	108.9	3.8	69	168.9	5.9	29	228.9	8.0	89	288.8	10.1
50	50.0	1.7	10	109.9	3.8	70	169.9	5.9	30	229.9	8.0	90	289.8	10.1
51	51.0	1.8	111	110.9	3.9	171	170.9	6.0	231	230.9	8.1	291	290.8	10.2
52	52.0	1.8	12	111.9	3.9	72	171.9	6.0	32	231.9	8.1	92	291.8	10.2
53	53.0	1.8	13	112.9	3.9	73	172.9	6.0	33	232.9	8.1	93	292.8	10.2
54	54.0	1.9	14	113.9	4.0	74	173.9	6.1	34	233.9	8.2	94	293.8	10.3
55	55.0	1.9	15	114.9	4.0	75	174.9	6.1	35	234.9	8.2	95	294.8	10.3
56	56.0	2.0	16	115.9	4.0	76	175.9	6.1	36	235.9	8.2	96	295.8	10.3
57	57.0	2.0	17	116.9	4.1	77	176.9	6.2	37	236.9	8.3	97	296.8	10.4
58	58.0	2.0	18	117.9	4.1	78	177.9	6.2	38	237.9	8.3	98	297.8	10.4
59	59.0	2.1	19	118.9	4.2	79	178.9	6.2	39	238.9	8.3	99	298.8	10.4
60	60.0	2.1	20	119.9	4.2	80	179.9	6.3	40	239.9	8.4	300	299.8	10.5
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

88° (92°, 268°, 272°).

TABLE 2.

Difference of Latitude and Departure for 2° (178°, 182°, 358°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	300.8	10.5	361	360.8	12.6	421	420.8	14.7	481	480.7	16.8	541	540.7	18.9
02	301.8	10.5	62	361.8	12.6	22	421.8	14.7	82	481.7	16.8	42	541.7	18.9
03	302.8	10.6	63	362.8	12.7	23	422.8	14.7	83	482.7	16.8	43	542.7	18.9
04	303.8	10.6	64	363.8	12.7	24	423.8	14.8	84	483.7	16.9	44	543.7	19.0
05	304.8	10.6	65	364.8	12.7	25	424.8	14.8	85	484.7	16.9	45	544.7	19.0
06	305.8	10.7	66	365.8	12.8	26	425.7	14.9	86	485.7	16.9	46	545.7	19.0
07	306.8	10.7	67	366.8	12.8	27	426.7	14.9	87	486.7	17.0	47	546.7	19.1
08	307.8	10.7	68	367.8	12.8	28	427.7	14.9	88	487.7	17.0	48	547.7	19.1
09	308.8	10.8	69	368.8	12.9	29	428.7	15.0	89	488.7	17.0	49	548.7	19.1
10	309.8	10.8	70	369.8	12.9	30	429.7	15.0	90	489.7	17.1	50	549.7	19.2
311	310.8	10.8	371	370.8	12.9	431	430.7	15.0	491	490.7	17.1	551	550.7	19.2
12	311.8	10.9	72	371.8	13.0	32	431.7	15.1	92	491.7	17.1	52	551.7	19.2
13	312.8	10.9	73	372.8	13.0	33	432.7	15.1	93	492.7	17.2	53	552.7	19.3
14	313.8	10.9	74	373.8	13.0	34	433.7	15.1	94	493.7	17.2	54	553.7	19.3
15	314.8	11.0	75	374.8	13.1	35	434.7	15.2	95	494.7	17.2	55	554.7	19.3
16	315.8	11.0	76	375.8	13.1	36	435.7	15.2	96	495.7	17.3	56	555.7	19.4
17	316.8	11.0	77	376.8	13.1	37	436.7	15.2	97	496.7	17.3	57	556.7	19.4
18	317.8	11.1	78	377.8	13.2	38	437.7	15.3	98	497.7	17.3	58	557.7	19.4
19	318.8	11.1	79	378.8	13.2	39	438.7	15.3	99	498.7	17.4	59	558.7	19.5
20	319.8	11.2	80	379.8	13.2	40	439.7	15.3	500	499.7	17.4	60	559.7	19.5
321	320.8	11.2	381	380.8	13.3	441	440.7	15.4	501	500.7	17.5	561	560.7	19.5
22	321.8	11.2	82	381.8	13.3	42	441.7	15.4	02	501.7	17.5	62	561.7	19.6
23	322.8	11.3	83	382.8	13.3	43	442.7	15.4	03	502.7	17.5	63	562.7	19.6
24	323.8	11.3	84	383.8	13.4	44	443.7	15.5	04	503.7	17.6	64	563.7	19.6
25	324.8	11.3	85	384.8	13.4	45	444.7	15.5	05	504.7	17.6	65	564.7	19.7
26	325.8	11.4	86	385.8	13.5	46	445.7	15.6	06	505.7	17.6	66	565.7	19.7
27	326.8	11.4	87	386.8	13.5	47	446.7	15.6	07	506.7	17.7	67	566.7	19.7
28	327.8	11.4	88	387.8	13.5	48	447.7	15.6	08	507.7	17.7	68	567.7	19.8
29	328.8	11.5	89	388.8	13.6	49	448.7	15.7	09	508.7	17.7	69	568.7	19.8
30	329.8	11.5	90	389.8	13.6	50	449.7	15.7	10	509.7	17.8	70	569.7	19.9
331	330.8	11.5	391	390.8	13.6	451	450.7	15.7	511	510.7	17.8	571	570.7	19.9
32	331.8	11.6	92	391.8	13.7	52	451.7	15.8	12	511.7	17.8	72	571.7	19.9
33	332.8	11.6	93	392.8	13.7	53	452.7	15.8	13	512.7	17.9	73	572.7	20.0
34	333.8	11.6	94	393.8	13.7	54	453.7	15.8	14	513.7	17.9	74	573.6	20.0
35	334.8	11.7	95	394.8	13.8	55	454.7	15.9	15	514.7	17.9	75	574.6	20.0
36	335.8	11.7	96	395.8	13.8	56	455.7	15.9	16	515.7	18.0	76	575.6	20.1
37	336.8	11.7	97	396.8	13.8	57	456.7	15.9	17	516.7	18.0	77	576.6	20.1
38	337.8	11.8	98	397.8	13.9	58	457.7	16.0	18	517.7	18.1	78	577.6	20.1
39	338.8	11.8	99	398.8	13.9	59	458.7	16.0	19	518.7	18.1	79	578.6	20.2
40	339.8	11.9	400	399.8	13.9	60	459.7	16.0	20	519.7	18.1	80	579.6	20.2
341	340.8	11.9	401	400.8	14.0	461	460.7	16.1	521	520.7	18.2	581	580.6	20.2
42	341.8	11.9	02	401.8	14.0	62	461.7	16.1	22	521.7	18.2	82	581.6	20.3
43	342.8	12.0	03	402.8	14.0	63	462.7	16.1	23	522.7	18.2	83	582.6	20.3
44	343.8	12.0	04	403.8	14.1	64	463.7	16.2	24	523.7	18.3	84	583.6	20.3
45	344.8	12.0	05	404.8	14.1	65	464.7	16.2	25	524.7	18.3	85	584.6	20.4
46	345.8	12.1	06	405.8	14.2	66	465.7	16.2	26	525.7	18.4	86	585.6	20.4
47	346.8	12.1	07	406.8	14.2	67	466.7	16.3	27	526.7	18.4	87	586.6	20.4
48	347.8	12.1	08	407.8	14.2	68	467.7	16.3	28	527.7	18.4	88	587.6	20.5
49	348.8	12.2	09	408.8	14.3	69	468.7	16.4	29	528.7	18.5	89	588.6	20.5
50	349.8	12.2	10	409.8	14.3	70	469.7	16.4	30	529.7	18.5	90	589.6	20.5
351	350.8	12.2	411	410.8	14.3	471	470.7	16.4	531	530.7	18.5	591	590.6	20.6
52	351.8	12.3	12	411.8	14.4	72	471.7	16.5	32	531.7	18.6	92	591.6	20.6
53	352.8	12.3	13	412.8	14.4	73	472.7	16.5	33	532.7	18.6	93	592.6	20.6
54	353.8	12.3	14	413.8	14.4	74	473.7	16.5	34	533.7	18.6	94	593.6	20.7
55	354.8	12.4	15	414.8	14.5	75	474.7	16.6	35	534.7	18.7	95	594.6	20.7
56	355.8	12.4	16	415.8	14.5	76	475.7	16.6	36	535.7	18.7	96	595.6	20.7
57	356.8	12.4	17	416.8	14.5	77	476.7	16.6	37	536.7	18.7	97	596.6	20.8
58	357.8	12.5	18	417.8	14.6	78	477.7	16.7	38	537.7	18.8	98	597.6	20.8
59	358.8	12.5	19	418.8	14.6	79	478.7	16.7	39	538.7	18.8	99	598.6	20.8
60	359.8	12.5	20	419.8	14.6	80	479.7	16.7	40	539.7	18.8	600	599.6	20.9
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

88° (92°, 268°, 272°).

TABLE 2.

Difference of Latitude and Departure for 3° (177°, 183°, 357°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.1	61	60.9	3.2	121	120.8	6.3	181	180.8	9.5	241	240.7	12.6
2	2.0	0.1	62	61.9	3.2	22	121.8	6.4	82	181.8	9.5	42	241.7	12.7
3	3.0	0.2	63	62.9	3.3	23	122.8	6.4	83	182.7	9.6	43	242.7	12.7
4	4.0	0.2	64	63.9	3.3	24	123.8	6.5	84	183.7	9.6	44	243.7	12.8
5	5.0	0.3	65	64.9	3.4	25	124.8	6.5	85	184.7	9.7	45	244.7	12.8
6	6.0	0.3	66	65.9	3.5	26	125.8	6.6	86	185.7	9.7	46	245.7	12.9
7	7.0	0.4	67	66.9	3.5	27	126.8	6.6	87	186.7	9.8	47	246.7	12.9
8	8.0	0.4	68	67.9	3.6	28	127.8	6.7	88	187.7	9.8	48	247.7	13.0
9	9.0	0.5	69	68.9	3.6	29	128.8	6.8	89	188.7	9.9	49	248.7	13.0
10	10.0	0.5	70	69.9	3.7	30	129.8	6.8	90	189.7	9.9	50	249.7	13.1
11	11.0	0.6	71	70.9	3.7	131	130.8	6.9	191	190.7	10.0	251	250.7	13.1
12	12.0	0.6	72	71.9	3.8	32	131.8	6.9	92	191.7	10.0	52	251.7	13.2
13	13.0	0.7	73	72.9	3.8	33	132.8	7.0	93	192.7	10.1	53	252.7	13.2
14	14.0	0.7	74	73.9	3.9	34	133.8	7.0	94	193.7	10.2	54	253.7	13.3
15	15.0	0.8	75	74.9	3.9	35	134.8	7.1	95	194.7	10.2	55	254.7	13.3
16	16.0	0.8	76	75.9	4.0	36	135.8	7.1	96	195.7	10.3	56	255.6	13.4
17	17.0	0.9	77	76.9	4.0	37	136.8	7.2	97	196.7	10.3	57	256.6	13.5
18	18.0	0.9	78	77.9	4.1	38	137.8	7.2	98	197.7	10.4	58	257.6	13.5
19	19.0	1.0	79	78.9	4.1	39	138.8	7.3	99	198.7	10.4	59	258.6	13.6
20	20.0	1.0	80	79.9	4.2	40	139.8	7.3	200	199.7	10.5	60	259.6	13.6
21	21.0	1.1	81	80.9	4.2	141	140.8	7.4	201	200.7	10.5	261	260.6	13.7
22	22.0	1.2	82	81.9	4.3	42	141.8	7.4	02	201.7	10.6	62	261.6	13.7
23	23.0	1.2	83	82.9	4.3	43	142.8	7.5	03	202.7	10.6	63	262.6	13.8
24	24.0	1.3	84	83.9	4.4	44	143.8	7.5	04	203.7	10.7	64	263.6	13.8
25	25.0	1.3	85	84.9	4.4	45	144.8	7.6	05	204.7	10.7	65	264.6	13.9
26	26.0	1.4	86	85.9	4.5	46	145.8	7.6	06	205.7	10.8	66	265.6	13.9
27	27.0	1.4	87	86.9	4.6	47	146.8	7.7	07	206.7	10.8	67	266.6	14.0
28	28.0	1.5	88	87.9	4.6	48	147.8	7.7	08	207.7	10.9	68	267.6	14.0
29	29.0	1.5	89	88.9	4.7	49	148.8	7.8	09	208.7	10.9	69	268.6	14.1
30	30.0	1.6	90	89.9	4.7	50	149.8	7.9	10	209.7	11.0	70	269.6	14.1
31	31.0	1.6	91	90.9	4.8	151	150.8	7.9	211	210.7	11.0	271	270.6	14.2
32	32.0	1.7	92	91.9	4.8	52	151.8	8.0	12	211.7	11.1	72	271.6	14.2
33	33.0	1.7	93	92.9	4.9	53	152.8	8.0	13	212.7	11.1	73	272.6	14.3
34	34.0	1.8	94	93.9	4.9	54	153.8	8.1	14	213.7	11.2	74	273.6	14.3
35	35.0	1.8	95	94.9	5.0	55	154.8	8.1	15	214.7	11.3	75	274.6	14.4
36	36.0	1.9	96	95.9	5.0	56	155.8	8.2	16	215.7	11.3	76	275.6	14.4
37	36.9	1.9	97	96.9	5.1	57	156.8	8.2	17	216.7	11.4	77	276.6	14.5
38	37.9	2.0	98	97.9	5.1	58	157.8	8.3	18	217.7	11.4	78	277.6	14.5
39	38.9	2.0	99	98.9	5.2	59	158.8	8.3	19	218.7	11.5	79	278.6	14.6
40	39.9	2.1	100	99.9	5.2	60	159.8	8.4	20	219.7	11.5	80	279.6	14.7
41	40.9	2.1	101	100.9	5.3	161	160.8	8.4	221	220.7	11.6	281	280.6	14.7
42	41.9	2.2	02	101.9	5.3	62	161.8	8.5	22	221.7	11.6	82	281.6	14.8
43	42.9	2.3	03	102.9	5.4	63	162.8	8.5	23	222.7	11.7	83	282.6	14.8
44	43.9	2.3	04	103.9	5.4	64	163.8	8.6	24	223.7	11.7	84	283.6	14.9
45	44.9	2.4	05	104.9	5.5	65	164.8	8.6	25	224.7	11.8	85	284.6	14.9
46	45.9	2.4	06	105.9	5.5	66	165.8	8.7	26	225.7	11.8	86	285.6	15.0
47	46.9	2.5	07	106.9	5.6	67	166.8	8.7	27	226.7	11.9	87	286.6	15.0
48	47.9	2.5	08	107.9	5.7	68	167.8	8.8	28	227.7	11.9	88	287.6	15.1
49	48.9	2.6	09	108.9	5.7	69	168.8	8.8	29	228.7	12.0	89	288.6	15.1
50	49.9	2.6	10	109.8	5.8	70	169.8	8.9	30	229.7	12.0	90	289.6	15.2
51	50.9	2.7	111	110.8	5.8	171	170.8	8.9	231	230.7	12.1	291	290.6	15.2
52	51.9	2.7	12	111.8	5.9	72	171.8	9.0	32	231.7	12.1	92	291.6	15.3
53	52.9	2.8	13	112.8	5.9	73	172.8	9.1	33	232.7	12.2	93	292.6	15.3
54	53.9	2.8	14	113.8	6.0	74	173.8	9.1	34	233.7	12.2	94	293.6	15.4
55	54.9	2.9	15	114.8	6.0	75	174.8	9.2	35	234.7	12.3	95	294.6	15.4
56	55.9	2.9	16	115.8	6.1	76	175.8	9.2	36	235.7	12.4	96	295.6	15.5
57	56.9	3.0	17	116.8	6.1	77	176.8	9.3	37	236.7	12.4	97	296.6	15.5
58	57.9	3.0	18	117.8	6.2	78	177.8	9.3	38	237.7	12.5	98	297.6	15.6
59	58.9	3.1	19	118.8	6.2	79	178.8	9.4	39	238.7	12.5	99	298.6	15.6
60	59.9	3.1	20	119.8	6.3	80	179.8	9.4	40	239.7	12.6	300	299.6	15.7
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

87° (93°, 267°, 273°).

TABLE 2.

Difference of Latitude and Departure for 3° (177°, 183°, 357°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	300.6	15.7	361	360.5	18.9	421	420.4	22.0	481	480.3	25.2	541	540.2	28.3
02	301.6	15.8	62	361.5	19.0	22	421.4	22.1	82	481.3	25.2	42	541.2	28.4
03	302.6	15.9	63	362.5	19.0	23	422.4	22.2	83	482.3	25.3	43	542.2	28.4
04	303.5	15.9	64	363.5	19.1	24	423.4	22.2	84	483.3	25.3	44	543.2	28.5
05	304.5	16.0	65	364.5	19.1	25	424.4	22.3	85	484.3	25.4	45	544.2	28.5
06	305.5	16.0	66	365.5	19.2	26	425.4	22.3	86	485.3	25.4	46	545.2	28.6
07	306.5	16.1	67	366.5	19.2	27	426.4	22.4	87	486.3	25.5	47	546.2	28.6
08	307.5	16.1	68	367.5	19.3	28	427.4	22.4	88	487.3	25.5	48	547.2	28.7
09	308.5	16.2	69	368.5	19.3	29	428.4	22.5	89	488.3	25.6	49	548.2	28.7
10	309.5	16.2	70	369.5	19.4	30	429.4	22.5	90	489.3	25.6	50	549.2	28.8
311	310.5	16.3	371	370.5	19.4	431	430.4	22.6	491	490.3	25.7	551	550.2	28.8
12	311.5	16.3	72	371.5	19.5	32	431.4	22.6	92	491.3	25.7	52	551.2	28.9
13	312.5	16.4	73	372.5	19.5	33	432.4	22.7	93	492.3	25.8	53	552.2	28.9
14	313.5	16.4	74	373.5	19.6	34	433.4	22.7	94	493.3	25.9	54	553.2	29.0
15	314.5	16.5	75	374.5	19.6	35	434.4	22.8	95	494.3	25.9	55	554.2	29.1
16	315.5	16.6	76	375.5	19.7	36	435.4	22.8	96	495.3	26.0	56	555.2	29.1
17	316.5	16.6	77	376.5	19.8	37	436.4	22.9	97	496.3	26.0	57	556.2	29.2
18	317.5	16.7	78	377.4	19.8	38	437.4	22.9	98	497.3	26.1	58	557.2	29.2
19	318.5	16.7	79	378.4	19.9	39	438.4	23.0	99	498.3	26.1	59	558.2	29.3
20	319.5	16.8	80	379.4	19.9	40	439.4	23.0	500	499.3	26.2	60	559.2	29.3
321	320.5	16.8	381	380.4	20.0	441	440.4	23.1	501	500.3	26.2	561	560.2	29.4
22	321.5	16.9	82	381.4	20.0	42	441.4	23.1	02	501.3	26.3	62	561.2	29.4
23	322.5	16.9	83	382.4	20.1	43	442.4	23.2	03	502.3	26.3	63	562.2	29.5
24	323.5	17.0	84	383.4	20.1	44	443.4	23.3	04	503.3	26.4	64	563.2	29.5
25	324.5	17.0	85	384.4	20.2	45	444.4	23.3	05	504.3	26.4	65	564.2	29.6
26	325.5	17.1	86	385.4	20.2	46	445.4	23.4	06	505.3	26.5	66	565.2	29.6
27	326.5	17.1	87	386.4	20.3	47	446.4	23.4	07	506.3	26.5	67	566.2	29.7
28	327.5	17.2	88	387.4	20.3	48	447.4	23.5	08	507.3	26.6	68	567.2	29.7
29	328.5	17.2	89	388.4	20.4	49	448.4	23.5	09	508.3	26.6	69	568.2	29.8
30	329.5	17.3	90	389.4	20.4	50	449.3	23.6	10	509.3	26.7	70	569.2	29.8
331	330.5	17.3	391	390.4	20.5	451	450.3	23.6	511	510.3	26.7	571	570.2	29.9
32	331.5	17.4	92	391.4	20.5	52	451.3	23.7	12	511.3	26.8	72	571.2	29.9
33	332.5	17.5	93	392.4	20.6	53	452.3	23.7	13	512.3	26.8	73	572.2	30.0
34	333.5	17.5	94	393.4	20.6	54	453.3	23.8	14	513.3	26.9	74	573.2	30.0
35	334.5	17.6	95	394.4	20.7	55	454.3	23.8	15	514.3	27.0	75	574.2	30.1
36	335.5	17.6	96	395.4	20.7	56	455.3	23.9	16	515.3	27.0	76	575.2	30.1
37	336.5	17.7	97	396.4	20.8	57	456.3	23.9	17	516.3	27.1	77	576.2	30.2
38	337.5	17.7	98	397.4	20.8	58	457.3	24.0	18	517.3	27.1	78	577.2	30.2
39	338.5	17.8	99	398.4	20.9	59	458.3	24.0	19	518.3	27.2	79	578.2	30.3
40	339.5	17.8	400	399.4	20.9	60	459.3	24.1	20	519.3	27.2	80	579.2	30.3
341	340.5	17.9	401	400.4	21.0	461	460.3	24.1	521	520.3	27.3	581	580.2	30.4
42	341.5	17.9	02	401.4	21.1	62	461.3	24.2	22	521.3	27.3	82	581.2	30.4
43	342.5	18.0	03	402.4	21.1	63	462.3	24.2	23	522.3	27.4	83	582.2	30.5
44	343.5	18.0	04	403.4	21.2	64	463.3	24.3	24	523.3	27.4	84	583.2	30.5
45	344.5	18.1	05	404.4	21.2	65	464.3	24.4	25	524.3	27.5	85	584.2	30.6
46	345.5	18.1	06	405.4	21.3	66	465.3	24.4	26	525.3	27.5	86	585.2	30.6
47	346.5	18.2	07	406.4	21.3	67	466.3	24.5	27	526.3	27.6	87	586.2	30.7
48	347.5	18.2	08	407.4	21.4	68	467.3	24.5	28	527.3	27.6	88	587.2	30.7
49	348.5	18.3	09	408.4	21.4	69	468.3	24.6	29	528.3	27.7	89	588.2	30.8
50	349.5	18.3	10	409.4	21.5	70	469.3	24.6	30	529.3	27.7	90	589.2	30.9
351	350.5	18.4	411	410.4	21.5	471	470.3	24.7	531	530.3	27.8	591	590.2	30.9
52	351.5	18.4	12	411.4	21.6	72	471.3	24.7	32	531.3	27.8	92	591.2	31.0
53	352.5	18.5	13	412.4	21.6	73	472.3	24.8	33	532.3	27.9	93	592.2	31.0
54	353.5	18.5	14	413.4	21.7	74	473.3	24.8	34	533.3	27.9	94	593.2	31.1
55	354.5	18.6	15	414.4	21.7	75	474.3	24.9	35	534.3	28.0	95	594.2	31.1
56	355.5	18.6	16	415.4	21.8	76	475.3	24.9	36	535.3	28.1	96	595.2	31.2
57	356.5	18.7	17	416.4	21.8	77	476.3	25.0	37	536.3	28.1	97	596.2	31.2
58	357.5	18.8	18	417.4	21.9	78	477.3	25.0	38	537.3	28.2	98	597.2	31.3
59	358.5	18.8	19	418.4	21.9	79	478.3	25.1	39	538.3	28.2	99	598.2	31.3
60	359.5	18.9	20	419.4	22.0	80	479.3	25.1	40	539.3	28.3	600	599.2	31.4
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

87° (93°, 267°, 273°).

TABLE 2.

Difference of Latitude and Departure for 4° (176°, 184°, 356°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.1	61	60.9	4.3	121	120.7	8.4	181	180.6	12.6	241	240.4	16.8
2	2.0	0.1	62	61.8	4.3	22	121.7	8.5	82	181.6	12.7	42	241.4	16.9
3	3.0	0.2	63	62.8	4.4	23	122.7	8.6	83	182.6	12.8	43	242.4	17.0
4	4.0	0.3	64	63.8	4.5	24	123.7	8.6	84	183.6	12.8	44	243.4	17.0
5	5.0	0.3	65	64.8	4.5	25	124.7	8.7	85	184.5	12.9	45	244.4	17.1
6	6.0	0.4	66	65.8	4.6	26	125.7	8.8	86	185.5	13.0	46	245.4	17.2
7	7.0	0.5	67	66.8	4.7	27	126.7	8.9	87	186.5	13.0	47	246.4	17.2
8	8.0	0.6	68	67.8	4.7	28	127.7	8.9	88	187.5	13.1	48	247.4	17.3
9	9.0	0.6	69	68.8	4.8	29	128.7	9.0	89	188.5	13.2	49	248.4	17.4
10	10.0	0.7	70	69.8	4.9	30	129.7	9.1	90	189.5	13.3	50	249.4	17.4
11	11.0	0.8	71	70.8	5.0	131	130.7	9.1	191	190.5	13.3	251	250.4	17.5
12	12.0	0.8	72	71.8	5.0	32	131.7	9.2	92	191.5	13.4	52	251.4	17.6
13	13.0	0.9	73	72.8	5.1	33	132.7	9.3	93	192.5	13.5	53	252.4	17.6
14	14.0	1.0	74	73.8	5.2	34	133.7	9.3	94	193.5	13.5	54	253.4	17.7
15	15.0	1.0	75	74.8	5.2	35	134.7	9.4	95	194.5	13.6	55	254.4	17.8
16	16.0	1.1	76	75.8	5.3	36	135.7	9.5	96	195.5	13.7	56	255.4	17.9
17	17.0	1.2	77	76.8	5.4	37	136.7	9.6	97	196.5	13.7	57	256.4	17.9
18	18.0	1.3	78	77.8	5.4	38	137.7	9.6	98	197.5	13.8	58	257.4	18.0
19	19.0	1.3	79	78.8	5.5	39	138.7	9.7	99	198.5	13.9	59	258.4	18.1
20	20.0	1.4	80	79.8	5.6	40	139.7	9.8	200	199.5	14.0	60	259.4	18.1
21	20.9	1.5	81	80.8	5.7	141	140.7	9.8	201	200.5	14.0	261	260.4	18.2
22	21.9	1.5	82	81.8	5.7	42	141.7	9.9	02	201.5	14.1	62	261.4	18.3
23	22.9	1.6	83	82.8	5.8	43	142.7	10.0	03	202.5	14.2	63	262.4	18.3
24	23.9	1.7	84	83.8	5.9	44	143.6	10.0	04	203.5	14.2	64	263.4	18.4
25	24.9	1.7	85	84.8	5.9	45	144.6	10.1	05	204.5	14.3	65	264.4	18.5
26	25.9	1.8	86	85.8	6.0	46	145.6	10.2	06	205.5	14.4	66	265.4	18.6
27	26.9	1.9	87	86.8	6.1	47	146.6	10.3	07	206.5	14.4	67	266.3	18.6
28	27.9	2.0	88	87.8	6.1	48	147.6	10.3	08	207.5	14.5	68	267.3	18.7
29	28.9	2.0	89	88.8	6.2	49	148.6	10.4	09	208.5	14.6	69	268.3	18.8
30	29.9	2.1	90	89.8	6.3	50	149.6	10.5	10	209.5	14.6	70	269.3	18.8
31	30.9	2.2	91	90.8	6.3	151	150.6	10.5	211	210.5	14.7	271	270.3	18.9
32	31.9	2.2	92	91.8	6.4	52	151.6	10.6	12	211.5	14.8	72	271.3	19.0
33	32.9	2.3	93	92.8	6.5	53	152.6	10.7	13	212.5	14.9	73	272.3	19.0
34	33.9	2.4	94	93.8	6.6	54	153.6	10.7	14	213.5	14.9	74	273.3	19.1
35	34.9	2.4	95	94.8	6.6	55	154.6	10.8	15	214.5	15.0	75	274.3	19.2
36	35.9	2.5	96	95.8	6.7	56	155.6	10.9	16	215.5	15.1	76	275.3	19.3
37	36.9	2.6	97	96.8	6.8	57	156.6	11.0	17	216.5	15.1	77	276.3	19.3
38	37.9	2.7	98	97.8	6.8	58	157.6	11.0	18	217.5	15.2	78	277.3	19.4
39	38.9	2.7	99	98.8	6.9	59	158.6	11.1	19	218.5	15.3	79	278.3	19.5
40	39.9	2.8	100	99.8	7.0	60	159.6	11.2	20	219.5	15.3	80	279.3	19.5
41	40.9	2.9	101	100.8	7.0	161	160.6	11.2	221	220.5	15.4	281	280.3	19.6
42	41.9	2.9	02	101.8	7.1	62	161.6	11.3	22	221.5	15.5	82	281.3	19.7
43	42.9	3.0	03	102.7	7.2	63	162.6	11.4	23	222.5	15.6	83	282.3	19.7
44	43.9	3.1	04	103.7	7.3	64	163.6	11.4	24	223.5	15.6	84	283.3	19.8
45	44.9	3.1	05	104.7	7.3	65	164.6	11.5	25	224.5	15.7	85	284.3	19.9
46	45.9	3.2	06	105.7	7.4	66	165.6	11.6	26	225.4	15.8	86	285.3	20.0
47	46.9	3.3	07	106.7	7.5	67	166.6	11.6	27	226.4	15.8	87	286.3	20.0
48	47.9	3.3	08	107.7	7.5	68	167.6	11.7	28	227.4	15.9	88	287.3	20.1
49	48.9	3.4	09	108.7	7.6	69	168.6	11.8	29	228.4	16.0	89	288.3	20.2
50	49.9	3.5	10	109.7	7.7	70	169.6	11.9	30	229.4	16.0	90	289.3	20.2
51	50.9	3.6	111	110.7	7.7	171	170.6	11.9	231	230.4	16.1	291	290.3	20.3
52	51.9	3.6	12	111.7	7.8	72	171.6	12.0	32	231.4	16.2	92	291.3	20.4
53	52.9	3.7	13	112.7	7.9	73	172.6	12.1	33	232.4	16.3	93	292.3	20.4
54	53.9	3.8	14	113.7	8.0	74	173.6	12.1	34	233.4	16.3	94	293.3	20.5
55	54.9	3.8	15	114.7	8.0	75	174.6	12.2	35	234.4	16.4	95	294.3	20.6
56	55.9	3.9	16	115.7	8.1	76	175.6	12.3	36	235.4	16.5	96	295.3	20.6
57	56.9	4.0	17	116.7	8.2	77	176.6	12.3	37	236.4	16.5	97	296.3	20.7
58	57.9	4.0	18	117.7	8.2	78	177.6	12.4	38	237.4	16.6	98	297.3	20.8
59	58.9	4.1	19	118.7	8.3	79	178.6	12.5	39	238.4	16.7	99	298.3	20.9
60	59.9	4.2	20	119.7	8.4	80	179.6	12.6	40	239.4	16.7	300	299.3	20.9
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

86°; (94°, 266°, 274°).

TABLE 2.

Difference of Latitude and Departure for 4° (176°, 184°, 356°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	300.3	21.0	361	360.1	25.2	421	420.0	29.4	481	479.8	33.5	541	539.7	37.7
02	301.3	21.1	62	361.1	25.2	22	421.0	29.4	82	480.8	33.6	42	540.7	37.8
03	302.2	21.1	63	362.1	25.3	23	422.0	29.5	83	481.8	33.7	43	541.7	37.9
04	303.2	21.2	64	363.1	25.4	24	423.0	29.6	84	482.8	33.7	44	542.7	37.9
05	304.2	21.3	65	364.1	25.5	25	424.0	29.6	85	483.8	33.8	45	543.7	38.0
06	305.2	21.3	66	365.1	25.5	26	424.9	29.7	86	484.8	33.9	46	544.7	38.1
07	306.2	21.4	67	366.1	25.6	27	425.9	29.8	87	485.8	33.9	47	545.7	38.1
08	307.2	21.5	68	367.1	25.7	28	426.9	29.9	88	486.8	34.0	48	546.7	38.2
09	308.2	21.6	69	368.1	25.7	29	427.9	29.9	89	487.8	34.1	49	547.7	38.3
10	309.2	21.6	70	369.1	25.8	30	428.9	30.0	90	488.8	34.2	50	548.7	38.3
311	310.2	21.7	371	370.1	25.9	431	429.9	30.1	491	489.8	34.2	551	549.7	38.4
12	311.2	21.8	72	371.1	25.9	32	430.9	30.1	92	490.8	34.3	52	550.7	38.5
13	312.2	21.8	73	372.1	26.0	33	431.9	30.2	93	491.8	34.4	53	551.7	38.5
14	313.2	21.9	74	373.1	26.1	34	432.9	30.3	94	492.8	34.4	54	552.7	38.6
15	314.2	22.0	75	374.1	26.2	35	433.9	30.3	95	493.8	34.5	55	553.6	38.7
16	315.2	22.1	76	375.1	26.2	36	434.9	30.4	96	494.8	34.6	56	554.6	38.7
17	316.2	22.1	77	376.1	26.3	37	435.9	30.5	97	495.8	34.6	57	555.6	38.8
18	317.2	22.2	78	377.1	26.4	38	436.9	30.6	98	496.8	34.7	58	556.6	38.9
19	318.2	22.3	79	378.1	26.4	39	437.9	30.6	99	497.8	34.8	59	557.6	38.9
20	319.2	22.3	80	379.1	26.5	40	438.9	30.7	500	498.8	34.8	60	558.6	39.0
321	320.2	22.4	381	380.1	26.6	441	439.9	30.8	501	499.8	34.9	561	559.6	39.1
22	321.2	22.5	82	381.1	26.6	42	440.9	30.8	02	500.8	35.0	62	560.6	39.2
23	322.2	22.5	83	382.1	26.7	43	441.9	30.9	03	501.8	35.0	63	561.6	39.2
24	323.2	22.6	84	383.1	26.8	44	442.9	31.0	04	502.8	35.1	64	562.6	39.3
25	324.2	22.7	85	384.0	26.9	45	443.9	31.0	05	503.8	35.2	65	563.6	39.4
26	325.2	22.7	86	385.0	26.9	46	444.9	31.1	06	504.8	35.2	66	564.6	39.4
27	326.2	22.8	87	386.0	27.0	47	445.9	31.2	07	505.8	35.3	67	565.6	39.5
28	327.2	22.9	88	387.0	27.1	48	446.9	31.2	08	506.8	35.4	68	566.6	39.6
29	328.2	23.0	89	388.0	27.1	49	447.9	31.3	09	507.8	35.5	69	567.6	39.7
30	329.2	23.0	90	389.0	27.2	50	448.9	31.4	10	508.8	35.6	70	568.6	39.8
331	330.2	23.1	391	390.0	27.3	451	449.9	31.5	511	509.8	35.6	571	569.6	39.8
32	331.2	23.2	92	391.0	27.3	52	450.9	31.5	12	510.8	35.7	72	570.6	39.9
33	332.2	23.2	93	392.0	27.4	53	451.9	31.6	13	511.8	35.8	73	571.6	40.0
34	333.2	23.3	94	393.0	27.5	54	452.9	31.7	14	512.7	35.8	74	572.6	40.0
35	334.2	23.4	95	394.0	27.6	55	453.9	31.7	15	513.7	35.9	75	573.6	40.1
36	335.2	23.4	96	395.0	27.6	56	454.9	31.8	16	514.7	36.0	76	574.6	40.2
37	336.2	23.5	97	396.0	27.7	57	455.9	31.9	17	515.7	36.0	77	575.6	40.2
38	337.2	23.6	98	397.0	27.8	58	456.9	31.9	18	516.7	36.1	78	576.6	40.3
39	338.2	23.6	99	398.0	27.8	59	457.9	32.0	19	517.7	36.2	79	577.6	40.4
40	339.2	23.7	400	399.0	27.9	60	458.9	32.1	20	518.7	36.2	80	578.6	40.5
341	340.2	23.8	401	400.0	28.0	461	459.9	32.2	521	519.7	36.3	581	579.6	40.5
42	341.2	23.9	02	401.0	28.0	62	460.9	32.2	22	520.7	36.4	82	580.6	40.6
43	342.2	23.9	03	402.0	28.1	63	461.9	32.3	23	521.7	36.4	83	581.6	40.7
44	343.1	24.0	04	403.0	28.2	64	462.9	32.4	24	522.7	36.5	84	582.6	40.7
45	344.1	24.1	05	404.0	28.2	65	463.9	32.4	25	523.7	36.6	85	583.6	40.8
46	345.1	24.1	06	405.0	28.3	66	464.9	32.5	26	524.7	36.7	86	584.6	40.9
47	346.1	24.2	07	406.0	28.4	67	465.8	32.6	27	525.7	36.8	87	585.6	40.9
48	347.1	24.3	08	407.0	28.5	68	466.8	32.6	28	526.7	36.8	88	586.6	41.0
49	348.1	24.3	09	408.0	28.5	69	467.8	32.7	29	527.7	36.9	89	587.6	41.1
50	349.1	24.4	10	409.0	28.6	70	468.8	32.8	30	528.7	37.0	90	588.6	41.2
351	350.1	24.5	411	410.0	28.7	471	469.8	32.9	531	529.7	37.0	591	589.6	41.3
52	351.1	24.6	12	411.0	28.7	72	470.8	32.9	32	530.7	37.1	92	590.6	41.3
53	352.1	24.6	13	412.0	28.8	73	471.8	33.0	33	531.7	37.2	93	591.6	41.4
54	353.1	24.7	14	413.0	28.9	74	472.8	33.1	34	532.7	37.2	94	592.6	41.5
55	354.1	24.8	15	414.0	28.9	75	473.8	33.1	35	533.7	37.3	95	593.6	41.5
56	355.1	24.8	16	415.0	29.0	76	474.8	33.2	36	534.7	37.4	96	594.6	41.6
57	356.1	24.9	17	416.0	29.1	77	475.8	33.3	37	535.7	37.5	97	595.6	41.7
58	357.1	25.0	18	417.0	29.2	78	476.8	33.3	38	536.7	37.5	98	596.6	41.7
59	358.1	25.0	19	418.0	29.2	79	477.8	33.4	39	537.7	37.6	99	597.6	41.8
60	359.1	25.1	20	419.0	29.3	80	478.8	35.5	40	538.7	37.7	600	598.6	41.9
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat

86°; (94°, 266°, 274°).

TABLE 2.

Difference of Latitude and Departure for 5° (175°, 185°, 355°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.1	61	60.8	5.3	121	120.5	10.5	181	180.3	15.8	241	240.1	21.0
2	2.0	0.2	62	61.8	5.4	22	121.5	10.6	82	181.3	15.9	42	241.1	21.1
3	3.0	0.3	63	62.8	5.5	23	122.5	10.7	83	182.3	15.9	43	242.1	21.2
4	4.0	0.3	64	63.8	5.6	24	123.5	10.8	84	183.3	16.0	44	243.1	21.3
5	5.0	0.4	65	64.8	5.7	25	124.5	10.9	85	184.3	16.1	45	244.1	21.4
6	6.0	0.5	66	65.7	5.8	26	125.5	11.0	86	185.3	16.2	46	245.1	21.4
7	7.0	0.6	67	66.7	5.8	27	126.5	11.1	87	186.3	16.3	47	246.1	21.5
8	8.0	0.7	68	67.7	5.9	28	127.5	11.2	88	187.3	16.4	48	247.1	21.6
9	9.0	0.8	69	68.7	6.0	29	128.5	11.2	89	188.3	16.5	49	248.1	21.7
10	10.0	0.9	70	69.7	6.1	30	129.5	11.3	90	189.3	16.6	50	249.0	21.8
11	11.0	1.0	71	70.7	6.2	131	130.5	11.4	191	190.3	16.6	251	250.0	21.9
12	12.0	1.0	72	71.7	6.3	32	131.5	11.5	92	191.3	16.7	52	251.0	22.0
13	13.0	1.1	73	72.7	6.4	33	132.5	11.6	93	192.3	16.8	53	252.0	22.1
14	13.9	1.2	74	73.7	6.4	34	133.5	11.7	94	193.3	16.9	54	253.0	22.1
15	14.9	1.3	75	74.7	6.5	35	134.5	11.8	95	194.3	17.0	55	254.0	22.2
16	15.9	1.4	76	75.7	6.6	36	135.5	11.9	96	195.3	17.1	56	255.0	22.3
17	16.9	1.5	77	76.7	6.7	37	136.5	11.9	97	196.3	17.2	57	256.0	22.4
18	17.9	1.6	78	77.7	6.8	38	137.5	12.0	98	197.2	17.3	58	257.0	22.5
19	18.9	1.7	79	78.7	6.9	39	138.5	12.1	99	198.2	17.3	59	258.0	22.6
20	19.9	1.7	80	79.7	7,0	40	139.5	12.2	200	199.2	17.4	60	259.0	22.7
21	20.9	1.8	81	80.7	7.1	141	140.5	12.3	201	200.2	17.5	261	260.0	22.7
22	21.9	1.9	82	81.7	7.1	42	141.5	12.4	02	201.2	17.6	62	261.0	22.8
23	22.9	2.0	83	82.7	7.2	43	142.5	12.5	03	202.2	17.7	63	262.0	22.9
24	23.9	2.1	84	83.7	7.3	44	143.5	12.6	04	203.2	17.8	64	263.0	23.0
25	24.9	2.2	85	84.7	7.4	45	144.4	12.6	05	204.2	17.9	65	264.0	23.1
26	25.9	2.3	86	85.7	7.5	46	145.4	12.7	06	205.2	18.0	66	265.0	23.2
27	26.9	2.4	87	86.7	7.6	47	146.4	12.8	07	206.2	18.0	67	266.0	23.3
28	27.9	2.4	88	87.7	7.7	48	147.4	12.9	08	207.2	18.1	68	267.0	23.4
29	28.9	2.5	89	88.7	7.8	49	148.4	13.0	09	208.2	18.2	69	268.0	23.4
30	29.9	2.6	90	89.7	7.8	50	149.4	13.1	10	209.2	18.3	70	269.0	23.5
31	30.9	2.7	91	90.7	7.9	151	150.4	13.2	211	210.2	18.4	271	270.0	23.6
32	31.9	2.8	92	91.6	8.0	52	151.4	13.2	12	211.2	18.5	72	271.0	23.7
33	32.9	2.9	93	92.6	8.1	53	152.4	13.3	13	212.2	18.6	73	272.0	23.8
34	33.9	3.0	94	93.6	8.2	54	153.4	13.4	14	213.2	18.7	74	273.0	23.9
35	34.9	3.1	95	94.6	8.3	55	154.4	13.5	15	214.2	18.7	75	274.0	24.0
36	35.9	3.1	96	95.6	8.4	56	155.4	13.6	16	215.2	18.8	76	274.9	24.1
37	36.9	3.2	97	96.6	8.5	57	156.4	13.7	17	216.2	18.9	77	275.9	24.1
38	37.9	3.3	98	97.6	8.5	58	157.4	13.8	18	217.2	19.0	78	276.9	24.2
39	38.9	3.4	99	98.6	8.6	59	158.4	13.9	19	218.2	19.1	79	277.9	24.3
40	39.8	3.5	100	99.6	8.7	60	159.4	13.9	20	219.2	19.2	80	278.9	24.4
41	40.8	3.6	101	100.6	8.8	161	160.4	14.0	221	220.2	19.3	281	279.9	24.5
42	41.8	3.7	02	101.6	8.9	62	161.4	14.1	22	221.2	19.3	82	280.9	24.6
43	42.8	3.7	03	102.6	9.0	63	162.4	14.2	23	222.2	19.4	83	281.9	24.7
44	43.8	3.8	04	103.6	9.1	64	163.4	14.3	24	223.1	19.5	84	282.9	24.8
45	44.8	3.9	05	104.6	9.2	65	164.4	14.4	25	224.1	19.6	85	283.9	24.8
46	45.8	4.0	06	105.6	9.2	66	165.4	14.5	26	225.1	19.7	86	284.9	24.9
47	46.8	4.1	07	106.6	9.3	67	166.4	14.6	27	226.1	19.8	87	285.9	25.0
48	47.8	4.2	08	107.6	9.4	68	167.4	14.6	28	227.1	19.9	88	286.9	25.1
49	48.8	4.3	09	108.6	9.5	69	168.4	14.7	29	228.1	20.0	89	287.9	25.2
50	49.8	4.4	10	109.6	9.6	70	169.4	14.8	30	229.1	20.0	90	288.9	25.3
51	50.8	4.4	111	110.6	9.7	171	170.3	14.9	231	230.1	20.1	291	289.9	25.4
52	51.8	4.5	12	111.6	9.8	72	171.3	15.0	32	231.1	20.2	92	290.9	25.4
53	52.8	4.6	13	112.6	9.8	73	172.3	15.1	33	232.1	20.3	93	291.9	25.5
54	53.8	4.7	14	113.6	9.9	74	173.3	15.2	34	233.1	20.4	94	292.9	25.6
55	54.8	4.8	15	114.6	10.0	75	174.3	15.3	35	234.1	20.5	95	293.9	25.7
56	55.8	4.9	16	115.6	10.1	76	175.3	15.3	36	235.1	20.6	96	294.9	25.8
57	56.8	5.0	17	116.6	10.2	77	176.3	15.4	37	236.1	20.7	97	295.9	25.9
58	57.8	5.1	18	117.6	10.3	78	177.3	15.5	38	237.1	20.7	98	296.9	26.0
59	58.8	5.1	19	118.5	10.4	79	178.3	15.6	39	238.1	20.8	99	297.9	26.1
60	59.8	5.2	20	119.5	10.5	80	179.3	15.7	40	239.1	20.9	300	298.9	26.1
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

85° (95°, 265°, 275°).

TABLE 2.

Difference of Latitude and Departure for 5° (175°, 185°, 355°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	299.9	26.2	361	359.6	31.5	421	419.4	36.7	481	479.2	41.9	541	538.9	47.2
02	300.8	26.3	62	360.6	31.6	22	420.4	36.8	82	480.2	42.0	42	539.9	47.3
03	301.8	26.4	63	361.6	31.6	23	421.4	36.9	83	481.2	42.1	43	540.9	47.4
04	302.8	26.5	64	362.6	31.7	24	422.4	37.0	84	482.2	42.2	44	541.9	47.5
05	303.8	26.6	65	363.6	31.8	25	423.4	37.1	85	483.2	42.3	45	542.9	47.6
06	304.8	26.7	66	364.6	31.9	26	424.4	37.1	86	484.1	42.4	46	543.9	47.7
07	305.8	26.8	67	365.6	32.0	27	425.4	37.2	87	485.1	42.4	47	544.9	47.7
08	306.8	26.9	68	366.6	32.1	28	426.4	37.3	88	486.1	42.5	48	545.9	47.8
09	307.8	26.9	69	367.6	32.2	29	427.4	37.4	89	487.1	42.6	49	546.9	47.9
10	308.8	27.0	70	368.6	32.3	30	428.4	37.5	90	488.1	42.7	50	547.9	48.0
311	309.8	27.1	371	369.6	32.3	431	429.4	37.6	491	489.1	42.8	551	548.9	48.1
12	310.8	27.2	72	370.6	32.4	32	430.4	37.7	92	490.1	42.9	52	549.9	48.2
13	311.8	27.3	73	371.6	32.5	33	431.3	37.7	93	491.1	43.0	53	550.9	48.3
14	312.8	27.4	74	372.6	32.6	34	432.3	37.8	94	492.1	43.1	54	551.9	48.4
15	313.8	27.5	75	373.6	32.7	35	433.3	37.9	95	493.1	43.1	55	552.9	48.4
16	314.8	27.5	76	374.6	32.8	36	434.3	38.0	96	494.1	43.2	56	553.9	48.5
17	315.8	27.6	77	375.6	32.9	37	435.3	38.1	97	495.1	43.3	57	554.9	48.6
18	316.8	27.7	78	376.6	33.0	38	436.3	38.2	98	496.1	43.4	58	555.9	48.7
19	317.8	27.8	79	377.6	33.0	39	437.3	38.3	99	497.1	43.5	59	556.9	48.8
20	318.8	27.9	80	378.6	33.1	40	438.3	38.4	500	498.1	43.6	60	557.9	48.8
321	319.8	28.0	381	379.5	33.2	441	439.3	38.4	501	499.1	43.7	561	558.8	48.9
22	320.8	28.1	82	380.5	33.3	42	440.3	38.5	02	500.1	43.8	62	559.8	49.0
23	321.8	28.2	83	381.5	33.4	43	441.3	38.6	03	501.1	43.8	63	560.8	49.1
24	322.8	28.2	84	382.5	33.5	44	442.3	38.7	04	502.1	43.9	64	561.8	49.2
25	323.8	28.3	85	383.5	33.6	45	443.3	38.8	05	503.1	44.0	65	562.8	49.3
26	324.8	28.4	86	384.5	33.7	46	444.3	38.9	06	504.1	44.1	66	563.8	49.4
27	325.8	28.5	87	385.5	33.7	47	445.3	39.0	07	505.1	44.2	67	564.8	49.5
28	326.7	28.6	88	386.5	33.8	48	446.3	39.1	08	506.1	44.3	68	565.8	49.6
29	327.7	28.7	89	387.5	33.9	49	447.3	39.1	09	507.1	44.4	69	566.8	49.7
30	328.7	28.8	90	388.5	34.0	50	448.3	39.2	10	508.1	44.5	70	567.8	49.7
331	329.7	28.9	391	389.5	34.1	451	449.3	39.3	511	509.0	44.5	571	568.8	49.8
32	330.7	28.9	92	390.5	34.2	52	450.3	39.4	12	510.0	44.6	72	569.8	49.9
33	331.7	29.0	93	391.5	34.3	53	451.3	39.5	13	511.0	44.7	73	570.8	50.0
34	332.7	29.1	94	392.5	34.3	54	452.3	39.6	14	512.0	44.8	74	571.8	50.1
35	333.7	29.2	95	393.5	34.4	55	453.3	39.7	15	513.0	44.9	75	572.8	50.2
36	334.7	29.3	96	394.5	34.5	56	454.3	39.8	16	514.0	45.0	76	573.8	50.3
37	335.7	29.4	97	395.5	34.6	57	455.3	39.8	17	515.0	45.1	77	574.8	50.4
38	336.7	29.5	98	396.5	34.7	58	456.3	39.9	18	516.0	45.2	78	575.8	50.4
39	337.7	29.6	99	397.5	34.8	59	457.3	40.0	19	517.0	45.2	79	576.8	50.5
40	338.7	29.6	400	398.5	34.9	60	458.2	40.1	20	518.0	45.3	80	577.8	50.6
341	339.7	29.7	401	399.5	35.0	461	459.2	40.2	521	519.0	45.4	581	578.8	50.7
42	340.7	29.8	02	400.5	35.0	62	460.2	40.3	22	520.0	45.5	82	579.8	50.8
43	341.7	29.9	03	401.5	35.1	63	461.2	40.4	23	521.0	45.6	83	580.8	50.9
44	342.7	30.0	04	402.5	35.2	64	462.2	40.4	24	522.0	45.7	84	581.8	50.9
45	343.7	30.1	05	403.5	35.3	65	463.2	40.5	25	523.0	45.8	85	582.8	51.0
46	344.7	30.2	06	404.5	35.4	66	464.2	40.6	26	524.0	45.9	86	583.8	51.1
47	345.7	30.3	07	405.4	35.5	67	465.2	40.7	27	525.0	45.9	87	584.8	51.2
48	346.7	30.3	08	406.4	35.6	68	466.2	40.8	28	526.0	46.0	88	585.8	51.3
49	347.7	30.4	09	407.4	35.7	69	467.2	40.9	29	527.0	46.1	89	586.8	51.4
50	348.7	30.5	10	408.4	35.7	70	468.2	41.0	30	528.0	46.2	90	587.8	51.5
351	349.7	30.6	411	409.4	35.8	471	469.2	41.1	531	529.0	46.3	591	588.7	51.6
52	350.7	30.7	12	410.4	35.9	72	470.2	41.1	32	530.0	46.4	92	589.7	51.6
53	351.7	30.8	13	411.4	36.0	73	471.2	41.2	33	531.0	46.5	93	590.7	51.7
54	352.6	30.9	14	412.4	36.1	74	472.2	41.3	34	532.0	46.6	94	591.7	51.8
55	353.6	30.9	15	413.4	36.2	75	473.2	41.4	35	533.0	46.6	95	592.7	51.9
56	354.6	31.0	16	414.4	36.3	76	474.2	41.5	36	533.9	46.7	96	593.7	52.0
57	355.6	31.1	17	415.4	36.4	77	475.2	41.6	37	534.9	46.8	97	594.7	52.1
58	356.6	31.2	18	416.4	36.4	78	476.2	41.7	38	535.9	46.9	98	595.7	52.2
59	357.6	31.3	19	417.4	36.5	79	477.2	41.8	39	536.9	47.0	99	596.7	52.3
60	358.6	31.4	20	418.4	36.6	80	478.2	41.8	40	537.9	47.1	600	597.7	52.3
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

85° (95°, 265°, 275°).

TABLE 2.

Difference of Latitude and Departure for 6° (174°, 186°, 354°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.1	61	60.7	6.4	121	120.3	12.6	181	180.0	18.9	241	239.7	25.2
2	2.0	0.2	62	61.7	6.5	22	121.3	12.8	82	181.0	19.0	42	240.7	25.3
3	3.0	0.3	63	62.7	6.6	23	122.3	12.9	83	182.0	19.1	43	241.7	25.4
4	4.0	0.4	64	63.6	6.7	24	123.3	13.0	84	183.0	19.2	44	242.7	25.5
5	5.0	0.5	65	64.6	6.8	25	124.3	13.1	85	184.0	19.3	45	243.7	25.6
6	6.0	0.6	66	65.6	6.9	26	125.3	13.2	86	185.0	19.4	46	244.7	25.7
7	7.0	0.7	67	66.6	7.0	27	126.3	13.3	87	186.0	19.5	47	245.6	25.8
8	8.0	0.8	68	67.6	7.1	28	127.3	13.4	88	187.0	19.7	48	246.6	25.9
9	9.0	0.9	69	68.6	7.2	29	128.3	13.5	89	188.0	19.8	49	247.6	26.0
10	9.9	1.0	70	69.6	7.3	30	129.3	13.6	90	189.0	19.9	50	248.6	26.1
11	10.9	1.1	71	70.6	7.4	131	130.3	13.7	191	190.0	20.0	251	249.6	26.2
12	11.9	1.3	72	71.6	7.5	32	131.3	13.8	92	190.9	20.1	52	250.6	26.3
13	12.9	1.4	73	72.6	7.6	33	132.3	13.9	93	191.9	20.2	53	251.6	26.4
14	13.9	1.5	74	73.6	7.7	34	133.3	14.0	94	192.9	20.3	54	252.6	26.6
15	14.9	1.6	75	74.6	7.8	35	134.3	14.1	95	193.9	20.4	55	253.6	26.7
16	15.9	1.7	76	75.6	7.9	36	135.3	14.2	96	194.9	20.5	56	254.6	26.8
17	16.9	1.8	77	76.6	8.0	37	136.2	14.3	97	195.9	20.6	57	255.6	26.9
18	17.9	1.9	78	77.6	8.2	38	137.2	14.4	98	196.9	20.7	58	256.6	27.0
19	18.9	2.0	79	78.6	8.3	39	138.2	14.5	99	197.9	20.8	59	257.6	27.1
20	19.9	2.1	80	79.6	8.4	40	139.2	14.6	200	198.9	20.9	60	258.6	27.2
21	20.9	2.2	81	80.6	8.5	141	140.2	14.7	201	199.9	21.0	261	259.6	27.3
22	21.9	2.3	82	81.6	8.6	42	141.2	14.8	02	200.9	21.1	62	260.6	27.4
23	22.9	2.4	83	82.5	8.7	43	142.2	14.9	03	201.9	21.2	63	261.6	27.5
24	23.9	2.5	84	83.5	8.8	44	143.2	15.1	04	202.9	21.3	64	262.6	27.6
25	24.9	2.6	85	84.5	8.9	45	144.2	15.2	05	203.9	21.4	65	263.5	27.7
26	25.9	2.7	86	85.5	9.0	46	145.2	15.3	06	204.9	21.5	66	264.5	27.8
27	26.9	2.8	87	86.5	9.1	47	146.2	15.4	07	205.9	21.6	67	265.5	27.9
28	27.8	2.9	88	87.5	9.2	48	147.2	15.5	08	206.9	21.7	68	266.5	28.0
29	28.8	3.0	89	88.5	9.3	49	148.2	15.6	09	207.9	21.8	69	267.5	28.1
30	29.8	3.1	90	89.5	9.4	50	149.2	15.7	10	208.8	22.0	70	268.5	28.2
31	30.8	3.2	91	90.5	9.5	151	150.2	15.8	211	209.8	22.1	271	269.5	28.3
32	31.8	3.3	92	91.5	9.6	52	151.2	15.9	12	210.8	22.2	72	270.5	28.4
33	32.8	3.4	93	92.5	9.7	53	152.2	16.0	13	211.8	22.3	73	271.5	28.5
34	33.8	3.6	94	93.5	9.8	54	153.2	16.1	14	212.8	22.4	74	272.5	28.6
35	34.8	3.7	95	94.5	9.9	55	154.2	16.2	15	213.8	22.5	75	273.5	28.7
36	35.8	3.8	96	95.5	10.0	56	155.1	16.3	16	214.8	22.6	76	274.5	28.8
37	36.8	3.9	97	96.5	10.1	57	156.1	16.4	17	215.8	22.7	77	275.5	29.0
38	37.8	4.0	98	97.5	10.2	58	157.1	16.5	18	216.8	22.8	78	276.5	29.1
39	38.8	4.1	99	98.5	10.3	59	158.1	16.6	19	217.8	22.9	79	277.5	29.2
40	39.8	4.2	100	99.5	10.5	60	159.1	16.7	20	218.8	23.0	80	278.5	29.3
41	40.8	4.3	101	100.4	10.6	161	160.1	16.8	221	219.8	23.1	281	279.5	29.4
42	41.8	4.4	02	101.4	10.7	62	161.1	16.9	22	220.8	23.2	82	280.5	29.5
43	42.8	4.5	03	102.4	10.8	63	162.1	17.0	23	221.8	23.3	83	281.4	29.6
44	43.8	4.6	04	103.4	10.9	64	163.1	17.1	24	222.8	23.4	84	282.4	29.7
45	44.8	4.7	05	104.4	11.0	65	164.1	17.2	25	223.8	23.5	85	283.4	29.8
46	45.7	4.8	06	105.4	11.1	66	165.1	17.4	26	224.8	23.6	86	284.4	29.9
47	46.7	4.9	07	106.4	11.2	67	166.1	17.5	27	225.8	23.7	87	285.4	30.0
48	47.7	5.0	08	107.4	11.3	68	167.1	17.6	28	226.8	23.8	88	286.4	30.1
49	48.7	5.1	09	108.4	11.4	69	168.1	17.7	29	227.7	23.9	89	287.4	30.2
50	49.7	5.2	10	109.4	11.5	70	169.1	17.8	30	228.7	24.0	90	288.4	30.3
51	50.7	5.3	111	110.4	11.6	171	170.1	17.9	231	229.7	24.1	291	289.4	30.4
52	51.7	5.4	12	111.4	11.7	72	171.1	18.0	32	230.7	24.3	92	290.4	30.5
53	52.7	5.5	13	112.4	11.8	73	172.1	18.1	33	231.7	24.4	93	291.4	30.6
54	53.7	5.6	14	113.4	11.9	74	173.0	18.2	34	232.7	24.5	94	292.4	30.7
55	54.7	5.7	15	114.4	12.0	75	174.0	18.3	35	233.7	24.6	95	293.4	30.8
56	55.7	5.9	16	115.4	12.1	76	175.0	18.4	36	234.7	24.7	96	294.4	30.9
57	56.7	6.0	17	116.4	12.2	77	176.0	18.5	37	235.7	24.8	97	295.4	31.0
58	57.7	6.1	18	117.4	12.3	78	177.0	18.6	38	236.7	24.9	98	296.4	31.1
59	58.7	6.2	19	118.3	12.4	79	178.0	18.7	39	237.7	25.0	99	297.4	31.3
60	59.7	6.3	20	119.3	12.5	80	179.0	18.8	40	238.7	25.1	300	298.4	31.4
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

84° (96°, 264°, 276°).

TABLE 2.

Difference of Latitude and Departure for 6° (174°, 186°, 354°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	299.3	31.5	361	359.0	37.7	421	418.7	44.0	481	478.4	50.3	541	538.0	56.5
02	300.3	31.6	62	360.0	37.8	22	419.7	44.1	82	479.4	50.4	42	539.0	56.6
03	301.3	31.7	63	361.0	37.9	23	420.7	44.2	83	480.4	50.5	43	540.0	56.7
04	302.3	31.8	64	362.0	38.0	24	421.7	44.3	84	481.3	50.6	44	541.0	56.8
05	303.3	31.9	65	363.0	38.1	25	422.7	44.4	85	482.3	50.7	45	542.0	56.9
06	304.3	32.0	66	364.0	38.3	26	423.7	44.5	86	483.3	50.8	46	543.0	57.0
07	305.3	32.1	67	365.0	38.4	27	424.7	44.6	87	484.3	50.9	47	544.0	57.1
08	306.3	32.2	68	366.0	38.5	28	425.7	44.7	88	485.3	51.0	48	545.0	57.2
09	307.3	32.3	69	367.0	38.6	29	426.6	44.8	89	486.3	51.1	49	546.0	57.3
10	308.3	32.4	70	368.0	38.7	30	427.6	44.9	90	487.3	51.2	50	547.0	57.4
311	309.3	32.5	371	369.0	38.8	431	428.6	45.0	491	488.3	51.3	551	548.0	57.5
12	310.3	32.6	72	370.0	38.9	32	429.6	45.2	92	489.3	51.4	52	549.0	57.6
13	311.3	32.7	73	371.0	39.0	33	430.6	45.3	93	490.3	51.5	53	550.0	57.7
14	312.3	32.8	74	371.9	39.1	34	431.6	45.4	94	491.3	51.6	54	551.0	57.9
15	313.3	32.9	75	372.9	39.2	35	432.6	45.5	95	492.3	51.7	55	552.0	58.0
16	314.3	33.0	76	373.9	39.3	36	433.6	45.6	96	493.3	51.8	56	553.0	58.1
17	315.3	33.1	77	374.9	39.4	37	434.6	45.7	97	494.3	51.9	57	554.0	58.2
18	316.3	33.2	78	375.9	39.5	38	435.6	45.8	98	495.3	52.0	58	555.0	58.3
19	317.3	33.3	79	376.9	39.6	39	436.6	45.9	99	496.3	52.1	59	556.0	58.4
20	318.2	33.4	80	377.9	39.7	40	437.6	46.0	500	497.3	52.3	60	556.9	58.5
321	319.2	33.6	381	378.9	39.8	441	438.6	46.1	501	498.3	52.4	561	557.9	58.6
22	320.2	33.7	82	379.9	39.9	42	439.6	46.2	02	499.3	52.5	62	558.9	58.7
23	321.2	33.8	83	380.9	40.0	43	440.6	46.3	03	500.2	52.6	63	559.9	58.8
24	322.2	33.9	84	381.9	40.1	44	441.6	46.4	04	501.2	52.7	64	560.9	59.0
25	323.2	34.0	85	382.9	40.2	45	442.6	46.5	05	502.2	52.8	65	561.9	59.1
26	324.2	34.1	86	383.9	40.3	46	443.6	46.6	06	503.2	52.9	66	562.9	59.2
27	325.2	34.2	87	384.9	40.5	47	444.5	46.7	07	504.2	53.0	67	563.9	59.3
28	326.2	34.3	88	385.9	40.6	48	445.5	46.8	08	505.2	53.1	68	564.9	59.4
29	327.2	34.4	89	386.9	40.7	49	446.5	46.9	09	506.2	53.2	69	565.9	59.5
30	328.2	34.5	90	387.9	40.8	50	447.5	47.0	10	507.2	53.3	70	566.9	59.6
331	329.2	34.6	391	388.9	40.9	451	448.5	47.1	511	508.2	53.4	571	567.9	59.7
32	330.2	34.7	92	389.9	41.0	52	449.5	47.2	12	509.2	53.5	72	568.9	59.8
33	331.2	34.8	93	390.8	41.1	53	450.5	47.3	13	510.2	53.6	73	569.9	59.9
34	332.2	34.9	94	391.8	41.2	54	451.5	47.5	14	511.2	53.7	74	570.9	60.0
35	333.2	35.0	95	392.8	41.3	55	452.5	47.6	15	512.2	53.8	75	571.9	60.1
36	334.2	35.1	96	393.8	41.4	56	453.5	47.7	16	513.2	53.9	76	572.9	60.2
37	335.2	35.2	97	394.8	41.5	57	454.5	47.8	17	514.2	54.0	77	573.9	60.3
38	336.1	35.3	98	395.8	41.6	58	455.5	47.9	18	515.2	54.1	78	574.9	60.4
39	337.1	35.4	99	396.8	41.7	59	456.5	48.0	19	516.2	54.2	79	575.8	60.5
40	338.1	35.5	400	397.8	41.8	60	457.5	48.1	20	517.2	54.3	80	576.8	60.6
341	339.1	35.6	401	398.8	41.9	461	458.5	48.2	521	518.1	54.5	581	577.8	60.7
42	340.1	35.7	02	399.8	42.0	62	459.5	48.3	22	519.1	54.6	82	578.8	60.8
43	341.1	35.8	03	400.8	42.1	63	460.5	48.4	23	520.1	54.7	83	579.8	60.9
44	342.1	36.0	04	401.8	42.2	64	461.5	48.5	24	521.1	54.8	84	580.8	61.1
45	343.1	36.1	05	402.8	42.3	65	462.5	48.6	25	522.1	54.9	85	581.8	61.2
46	344.1	36.2	06	403.8	42.4	66	463.4	48.7	26	523.1	55.0	86	582.8	61.3
47	345.1	36.3	07	404.8	42.5	67	464.4	48.8	27	524.1	55.1	87	583.8	61.4
48	346.1	36.4	08	405.8	42.6	68	465.4	48.9	28	525.1	55.2	88	584.8	61.5
49	347.1	36.5	09	406.8	42.7	69	466.4	49.0	29	526.1	55.3	89	585.8	61.6
50	348.1	36.6	10	407.8	42.9	70	467.4	49.1	30	527.1	55.4	90	586.8	61.7
351	349.1	36.7	411	408.7	43.0	471	468.4	49.2	531	528.1	55.5	591	587.8	61.8
52	350.1	36.8	12	409.7	43.1	72	469.4	49.3	32	529.1	55.6	92	588.8	61.9
53	351.1	36.9	13	410.7	43.2	73	470.4	49.4	33	530.1	55.7	93	589.8	62.0
54	352.1	37.0	14	411.7	43.3	74	471.4	49.5	34	531.1	55.8	94	590.8	62.1
55	353.1	37.1	15	412.7	43.4	75	472.4	49.6	35	532.1	55.9	95	591.8	62.2
56	354.0	37.2	16	413.7	43.5	76	473.4	49.8	36	533.1	56.0	96	592.8	62.3
57	355.0	37.3	17	414.7	43.6	77	474.4	49.9	37	534.1	56.1	97	593.8	62.4
58	356.0	37.4	18	415.7	43.7	78	475.4	50.0	38	535.1	56.2	98	594.7	62.5
59	357.0	37.5	19	416.7	43.8	79	476.4	50.1	39	536.1	56.3	99	595.7	62.6
60	358.0	37.6	20	417.7	43.9	80	477.4	50.2	40	537.1	56.4	600	596.7	62.7
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

84° (96°, 264°, 276°).

TABLE 2.

Difference of Latitude and Departure for 7° (173°, 187°, 353°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.1	61	60.5	7.4	121	120.1	14.7	181	179.7	22.1	241	239.2	29.4
2	2.0	0.2	62	61.5	7.6	22	121.1	14.9	82	180.6	22.2	42	240.2	29.5
3	3.0	0.4	63	62.5	7.7	23	122.1	15.0	83	181.6	22.3	43	241.2	29.6
4	4.0	0.5	64	63.5	7.8	24	123.1	15.1	84	182.6	22.4	44	242.2	29.7
5	5.0	0.6	65	64.5	7.9	25	124.1	15.2	85	183.6	22.5	45	243.2	29.9
6	6.0	0.7	66	65.5	8.0	26	125.1	15.4	86	184.6	22.7	46	244.2	30.0
7	6.9	0.9	67	66.5	8.2	27	126.1	15.5	87	185.6	22.8	47	245.2	30.1
8	7.9	1.0	68	67.5	8.3	28	127.0	15.6	88	186.6	22.9	48	246.2	30.2
9	8.9	1.1	69	68.5	8.4	29	128.0	15.7	89	187.6	23.0	49	247.1	30.3
10	9.9	1.2	70	69.5	8.5	30	129.0	15.8	90	188.6	23.2	50	248.1	30.5
11	10.9	1.3	71	70.5	8.7	131	130.0	16.0	191	189.6	23.3	251	249.1	30.6
12	11.9	1.5	72	71.5	8.8	32	131.0	16.1	92	190.6	23.4	52	250.1	30.7
13	12.9	1.6	73	72.5	8.9	33	132.0	16.2	93	191.6	23.5	53	251.1	30.8
14	13.9	1.7	74	73.4	9.0	34	133.0	16.3	94	192.6	23.6	54	252.1	31.0
15	14.9	1.8	75	74.4	9.1	35	134.0	16.5	95	193.5	23.8	55	253.1	31.1
16	15.9	1.9	76	75.4	9.3	36	135.0	16.6	96	194.5	23.9	56	254.1	31.2
17	16.9	2.1	77	76.4	9.4	37	136.0	16.7	97	195.5	24.0	57	255.1	31.3
18	17.9	2.2	78	77.4	9.5	38	137.0	16.8	98	196.5	24.1	58	256.1	31.4
19	18.9	2.3	79	78.4	9.6	39	138.0	16.9	99	197.5	24.3	59	257.1	31.6
20	19.9	2.4	80	79.4	9.7	40	139.0	17.1	200	198.5	24.4	60	258.1	31.7
21	20.8	2.6	81	80.4	9.9	141	139.9	17.2	201	199.5	24.5	261	259.1	31.8
22	21.8	2.7	82	81.4	10.0	42	140.9	17.3	02	200.5	24.6	62	260.0	31.9
23	22.8	2.8	83	82.4	10.1	43	141.9	17.4	03	201.5	24.7	63	261.0	32.1
24	23.8	2.9	84	83.4	10.2	44	142.9	17.5	04	202.5	24.9	64	262.0	32.2
25	24.8	3.0	85	84.4	10.4	45	143.9	17.7	05	203.5	25.0	65	263.0	32.3
26	25.8	3.2	86	85.4	10.5	46	144.9	17.8	06	204.5	25.1	66	264.0	32.4
27	26.8	3.3	87	86.4	10.6	47	145.9	17.9	07	205.5	25.2	67	265.0	32.5
28	27.8	3.4	88	87.3	10.7	48	146.9	18.0	08	206.4	25.3	68	266.0	32.7
29	28.8	3.5	89	88.3	10.8	49	147.9	18.2	09	207.4	25.5	69	267.0	32.8
30	29.8	3.7	90	89.3	11.0	50	148.9	18.3	10	208.4	25.6	70	268.0	32.9
31	30.8	3.8	91	90.3	11.1	151	149.9	18.4	211	209.4	25.7	271	269.0	33.0
32	31.8	3.9	92	91.3	11.2	52	150.9	18.5	12	210.4	25.8	72	270.0	33.1
33	32.8	4.0	93	92.3	11.3	53	151.9	18.6	13	211.4	26.0	73	271.0	33.3
34	33.7	4.1	94	93.3	11.5	54	152.9	18.8	14	212.4	26.1	74	272.0	33.4
35	34.7	4.3	95	94.3	11.6	55	153.8	18.9	15	213.4	26.2	75	273.0	33.5
36	35.7	4.4	96	95.3	11.7	56	154.8	19.0	16	214.4	26.3	76	273.9	33.6
37	36.7	4.5	97	96.3	11.8	57	155.8	19.1	17	215.4	26.4	77	274.9	33.8
38	37.7	4.6	98	97.3	11.9	58	156.8	19.3	18	216.4	26.6	78	275.9	33.9
39	38.7	4.8	99	98.3	12.1	59	157.8	19.4	19	217.4	26.7	79	276.9	34.0
40	39.7	4.9	100	99.3	12.2	60	158.8	19.5	20	218.4	26.8	80	277.9	34.1
41	40.7	5.0	101	100.2	12.3	161	159.8	19.6	221	219.4	26.9	281	278.9	34.2
42	41.7	5.1	02	101.2	12.4	62	160.8	19.7	22	220.3	27.1	82	279.9	34.4
43	42.7	5.2	03	102.2	12.6	63	161.8	19.9	23	221.3	27.2	83	280.9	34.5
44	43.7	5.4	04	103.2	12.7	64	162.8	20.0	24	222.3	27.3	84	281.9	34.6
45	44.7	5.5	05	104.2	12.8	65	163.8	20.1	25	223.3	27.4	85	282.9	34.7
46	45.7	5.6	06	105.2	12.9	66	164.8	20.2	26	224.3	27.5	86	283.9	34.9
47	46.6	5.7	07	106.2	13.0	67	165.8	20.4	27	225.3	27.7	87	284.9	35.0
48	47.6	5.8	08	107.2	13.2	68	166.7	20.5	28	226.3	27.8	88	285.9	35.1
49	48.6	6.0	09	108.2	13.3	69	167.7	20.6	29	227.3	27.9	89	286.8	35.2
50	49.6	6.1	10	109.2	13.4	70	168.7	20.7	30	228.3	28.0	90	287.8	35.3
51	50.6	6.2	111	110.2	13.5	171	169.7	20.8	231	229.3	28.2	291	288.8	35.5
52	51.6	6.3	12	111.2	13.6	72	170.7	21.0	32	230.3	28.3	92	289.8	35.6
53	52.6	6.5	13	112.2	13.8	73	171.7	21.1	33	231.3	28.4	93	290.8	35.7
54	53.6	6.6	14	113.2	13.9	74	172.7	21.2	34	232.3	28.5	94	291.8	35.8
55	54.6	6.7	15	114.1	14.0	75	173.7	21.3	35	233.2	28.6	95	292.8	36.0
56	55.6	6.8	16	115.1	14.1	76	174.7	21.4	36	234.2	28.8	96	293.8	36.1
57	56.6	6.9	17	116.1	14.3	77	175.7	21.6	37	235.2	28.9	97	294.8	36.2
58	57.6	7.1	18	117.1	14.4	78	176.7	21.7	38	236.2	29.0	98	295.8	36.3
59	58.6	7.2	19	118.1	14.5	79	177.7	21.8	39	237.2	29.1	99	296.8	36.4
60	59.6	7.3	20	119.1	14.6	80	178.7	21.9	40	238.2	29.2	300	297.8	36.6
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

83° (97°, 263°, 277°).

TABLE 2.

Difference of Latitude and Departure for 7° (173°, 187°, 353°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	298.7	36.7	361	358.3	44.0	421	417.9	51.3	481	477.4	58.6	541	537.0	65.9
02	299.7	36.8	62	359.3	44.1	22	418.8	51.4	82	478.4	58.7	42	537.9	66.0
03	300.7	36.9	63	360.3	44.2	23	419.8	51.5	83	479.4	58.8	43	538.9	66.2
04	301.7	37.0	64	361.3	44.4	24	420.8	51.7	84	480.4	59.0	44	539.9	66.3
05	302.7	37.2	65	362.3	44.5	25	421.8	51.8	85	481.4	59.1	45	540.9	66.4
06	303.7	37.3	66	363.3	44.6	26	422.8	51.9	86	482.4	59.2	46	541.9	66.6
07	304.7	37.4	67	364.3	44.7	27	423.8	52.0	87	483.4	59.4	47	542.9	66.7
08	305.7	37.5	68	365.2	44.8	28	424.8	52.2	88	484.3	59.5	48	543.9	66.8
09	306.7	37.7	69	366.2	45.0	29	425.8	52.3	89	485.3	59.6	49	544.9	66.9
10	307.7	37.8	70	367.2	45.1	30	426.8	52.4	90	486.3	59.7	50	545.9	67.0
311	308.7	37.9	371	368.2	45.2	431	427.8	52.5	491	487.3	59.8	551	546.9	67.1
12	309.7	38.0	72	369.2	45.3	32	428.8	52.6	92	488.3	59.9	52	547.9	67.2
13	310.7	38.1	73	370.2	45.5	33	429.8	52.8	93	489.3	60.1	53	548.9	67.4
14	311.7	38.3	74	371.2	45.6	34	430.8	52.9	94	490.3	60.2	54	549.9	67.5
15	312.6	38.4	75	372.2	45.7	35	431.7	53.0	95	491.3	60.3	55	550.8	67.6
16	313.6	38.5	76	373.2	45.8	36	432.7	53.1	96	492.3	60.5	56	551.8	67.8
17	314.6	38.6	77	374.2	45.9	37	433.7	53.3	97	493.3	60.6	57	552.8	67.9
18	315.6	38.7	78	375.2	46.1	38	434.7	53.4	98	494.3	60.7	58	553.8	68.0
19	316.6	38.9	79	376.2	46.2	39	435.7	53.5	99	495.3	60.8	59	554.8	68.1
20	317.6	39.0	80	377.2	46.3	40	436.7	53.6	500	496.3	61.0	60	555.8	68.3
321	318.6	39.1	381	378.1	46.4	441	437.7	53.7	501	497.2	61.1	561	556.8	68.4
22	319.6	39.2	82	379.1	46.5	42	438.7	53.9	02	498.2	61.2	62	557.8	68.5
23	320.6	39.4	83	380.1	46.7	43	439.7	54.0	03	499.2	61.3	63	558.8	68.6
24	321.6	39.5	84	381.1	46.8	44	440.7	54.1	04	500.2	61.4	64	559.8	68.7
25	322.6	39.6	85	382.1	46.9	45	441.7	54.2	05	501.2	61.5	65	560.8	68.9
26	323.6	39.7	86	383.1	47.0	46	442.7	54.3	06	502.2	61.6	66	561.8	69.0
27	324.6	39.8	87	384.1	47.2	47	443.7	54.5	07	503.2	61.8	67	562.8	69.1
28	325.5	40.0	88	385.1	47.3	48	444.7	54.6	08	504.2	61.9	68	563.8	69.2
29	326.5	40.1	89	386.1	47.4	49	445.6	54.7	09	505.2	62.0	69	564.8	69.3
30	327.5	40.2	90	387.1	47.5	50	446.6	54.8	10	506.2	62.1	70	565.8	69.4
331	328.5	40.3	391	388.1	47.6	451	447.6	55.0	511	507.2	62.3	571	566.7	69.6
32	329.5	40.5	92	389.1	47.8	52	448.6	55.1	12	508.2	62.4	72	567.7	69.7
33	330.5	40.6	93	390.1	47.9	53	449.6	55.2	13	509.2	62.5	73	568.7	69.8
34	331.5	40.7	94	391.1	48.0	54	450.6	55.3	14	510.2	62.6	74	569.7	69.9
35	332.5	40.8	95	392.0	48.1	55	451.6	55.4	15	511.1	62.7	75	570.7	70.1
36	333.5	40.9	96	393.0	48.3	56	452.6	55.6	16	512.1	62.9	76	571.7	70.2
37	334.5	41.1	97	394.0	48.4	57	453.6	55.7	17	513.1	63.0	77	572.7	70.3
38	335.5	41.2	98	395.0	48.5	58	454.6	55.8	18	514.1	63.1	78	573.7	70.4
39	336.5	41.3	99	396.0	48.6	59	455.6	55.9	19	515.1	63.2	79	574.7	70.5
40	337.5	41.4	400	397.0	48.7	60	456.6	56.1	20	516.1	63.4	80	575.7	70.7
341	338.4	41.6	401	398.0	48.9	461	457.6	56.2	521	517.1	63.5	581	576.7	70.8
42	339.4	41.7	02	399.0	49.0	62	458.5	56.3	22	518.1	63.6	82	577.6	70.9
43	340.4	41.8	03	400.0	49.1	63	459.5	56.4	23	519.1	63.7	83	578.6	71.0
44	341.4	41.9	04	401.0	49.2	64	460.5	56.5	24	520.1	63.8	84	579.6	71.2
45	342.4	42.0	05	402.0	49.4	65	461.5	56.7	25	521.1	64.0	85	580.6	71.3
46	343.4	42.2	06	403.0	49.5	66	462.5	56.8	26	522.1	64.1	86	581.6	71.4
47	344.4	42.3	07	404.0	49.6	67	463.5	56.9	27	523.1	64.2	87	582.6	71.5
48	345.4	42.4	08	405.0	49.7	68	464.5	57.0	28	524.1	64.3	88	583.6	71.6
49	346.4	42.5	09	405.9	49.8	69	465.5	57.2	29	525.0	64.5	89	584.6	71.8
50	347.4	42.6	10	406.9	50.0	70	466.5	57.3	30	526.0	64.6	90	585.6	71.9
351	348.4	42.8	411	407.9	50.1	471	467.5	57.4	531	527.0	64.7	591	586.6	72.0
52	349.4	42.9	12	408.9	50.2	72	468.5	57.5	32	528.0	64.8	92	587.6	72.1
53	350.4	43.0	13	409.9	50.3	73	469.5	57.6	33	529.0	64.9	93	588.6	72.2
54	351.4	43.1	14	410.9	50.4	74	470.5	57.8	34	530.0	65.1	94	589.6	72.4
55	352.3	43.3	15	411.9	50.6	75	471.5	57.9	35	531.0	65.2	95	590.6	72.5
56	353.3	43.4	16	412.9	50.7	76	472.4	58.0	36	532.0	65.3	96	591.5	72.6
57	354.3	43.5	17	413.9	50.8	77	473.4	58.1	37	533.0	65.4	97	592.5	72.7
58	355.3	43.6	18	414.9	50.9	78	474.4	58.2	38	534.0	65.6	98	593.5	72.9
59	356.3	43.7	19	415.9	51.1	79	475.4	58.4	39	535.0	65.7	99	594.5	73.0
60	357.3	43.9	20	416.9	51.2	80	476.4	58.5	40	536.0	65.8	600	595.5	73.1
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

83° (97°, 263°, 277°).

TABLE 2.

Difference of Latitude and Departure for 8° (172°, 188°, 352°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.1	61	60.4	8.5	121	119.8	16.8	181	179.2	25.2	241	238.7	33.5
2	2.0	0.3	62	61.4	8.6	22	120.8	17.0	82	180.2	25.3	42	239.6	33.7
3	3.0	0.4	63	62.4	8.8	23	121.8	17.1	83	181.2	25.5	43	240.6	33.8
4	4.0	0.6	64	63.4	8.9	24	122.8	17.3	84	182.2	25.6	44	241.6	34.0
5	5.0	0.7	65	64.4	9.0	25	123.8	17.4	85	183.2	25.7	45	242.6	34.1
6	5.9	0.8	66	65.4	9.2	26	124.8	17.5	86	184.2	25.9	46	243.6	34.2
7	6.9	1.0	67	66.3	9.3	27	125.8	17.7	87	185.2	26.0	47	244.6	34.4
8	7.9	1.1	68	67.3	9.5	28	126.8	17.8	88	186.2	26.2	48	245.6	34.5
9	8.9	1.3	69	68.3	9.6	29	127.7	18.0	89	187.2	26.3	49	246.6	34.7
10	9.9	1.4	70	69.3	9.7	30	128.7	18.1	90	188.2	26.4	50	247.6	34.8
11	10.9	1.5	71	70.3	9.9	131	129.7	18.2	191	189.1	26.6	251	248.6	34.9
12	11.9	1.7	72	71.3	10.0	32	130.7	18.4	92	190.1	26.7	52	249.5	35.1
13	12.9	1.8	73	72.3	10.2	33	131.7	18.5	93	191.1	26.9	53	250.5	35.2
14	13.9	1.9	74	73.3	10.3	34	132.7	18.6	94	192.1	27.0	54	251.5	35.3
15	14.9	2.1	75	74.3	10.4	35	133.7	18.8	95	193.1	27.1	55	252.5	35.5
16	15.8	2.2	76	75.3	10.6	36	134.7	18.9	96	194.1	27.3	56	253.5	35.6
17	16.8	2.4	77	76.3	10.7	37	135.7	19.1	97	195.1	27.4	57	254.5	35.8
18	17.8	2.5	78	77.2	10.9	38	136.7	19.2	98	196.1	27.6	58	255.5	35.9
19	18.8	2.6	79	78.2	11.0	39	137.7	19.3	99	197.1	27.7	59	256.5	36.0
20	19.8	2.8	80	79.2	11.1	40	138.6	19.5	200	198.1	27.8	60	257.5	36.2
21	20.8	2.9	81	80.2	11.3	141	139.6	19.6	201	199.0	28.0	261	258.5	36.3
22	21.8	3.1	82	81.2	11.4	42	140.6	19.8	02	200.0	28.1	62	259.5	36.5
23	22.8	3.2	83	82.2	11.6	43	141.6	19.9	03	201.0	28.3	63	260.4	36.6
24	23.8	3.3	84	83.2	11.7	44	142.6	20.0	04	202.0	28.4	64	261.4	36.7
25	24.8	3.5	85	84.2	11.8	45	143.6	20.2	05	203.0	28.5	65	262.4	36.9
26	25.7	3.6	86	85.2	12.0	46	144.6	20.3	06	204.0	28.7	66	263.4	37.0
27	26.7	3.8	87	86.2	12.1	47	145.6	20.5	07	205.0	28.8	67	264.4	37.2
28	27.7	3.9	88	87.1	12.2	48	146.6	20.6	08	206.0	28.9	68	265.4	37.3
29	28.7	4.0	89	88.1	12.4	49	147.5	20.7	09	207.0	29.1	69	266.4	37.4
30	29.7	4.2	90	89.1	12.5	50	148.5	20.9	10	208.0	29.2	70	267.4	37.6
31	30.7	4.3	91	90.1	12.7	151	149.5	21.0	211	208.9	29.4	271	268.4	37.7
32	31.7	4.5	92	91.1	12.8	52	150.5	21.2	12	209.9	29.5	72	269.4	37.9
33	32.7	4.6	93	92.1	12.9	53	151.5	21.3	13	210.9	29.6	73	270.3	38.0
34	33.7	4.7	94	93.1	13.1	54	152.5	21.4	14	211.9	29.8	74	271.3	38.1
35	34.7	4.9	95	94.1	13.2	55	153.5	21.6	15	212.9	29.9	75	272.3	38.3
36	35.6	5.0	96	95.1	13.4	56	154.5	21.7	16	213.9	30.1	76	273.3	38.4
37	36.6	5.1	97	96.1	13.5	57	155.5	21.9	17	214.9	30.2	77	274.3	38.6
38	37.6	5.3	98	97.0	13.6	58	156.5	22.0	18	215.9	30.3	78	275.3	38.7
39	38.6	5.4	99	98.0	13.8	59	157.5	22.1	19	216.9	30.5	79	276.3	38.8
40	39.6	5.6	100	99.0	13.9	60	158.4	22.3	20	217.9	30.6	80	277.3	39.0
41	40.6	5.7	101	100.0	14.1	161	159.4	22.4	221	218.8	30.8	281	278.3	39.1
42	41.6	5.8	02	101.0	14.2	62	160.4	22.5	22	219.8	30.9	82	279.3	39.2
43	42.6	6.0	03	102.0	14.3	63	161.4	22.7	23	220.8	31.0	83	280.2	39.4
44	43.6	6.1	04	103.0	14.5	64	162.4	22.8	24	221.8	31.2	84	281.2	39.5
45	44.6	6.3	05	104.0	14.6	65	163.4	23.0	25	222.8	31.3	85	282.2	39.7
46	45.6	6.4	06	105.0	14.8	66	164.4	23.1	26	223.8	31.5	86	283.2	39.8
47	46.5	6.5	07	106.0	14.9	67	165.4	23.2	27	224.8	31.6	87	284.2	39.9
48	47.5	6.7	08	106.9	15.0	68	166.4	23.4	28	225.8	31.7	88	285.2	40.1
49	48.5	6.8	09	107.9	15.2	69	167.4	23.5	29	226.8	31.9	89	286.2	40.2
50	49.5	7.0	10	108.9	15.3	70	168.3	23.7	30	227.8	32.0	90	287.2	40.4
51	50.5	7.1	111	109.9	15.4	171	169.3	23.8	231	228.8	32.1	291	288.2	40.5
52	51.5	7.2	12	110.9	15.6	72	170.3	23.9	32	229.7	32.3	92	289.2	40.6
53	52.5	7.4	13	111.9	15.7	73	171.3	24.1	33	230.7	32.4	93	290.1	40.8
54	53.5	7.5	14	112.9	15.9	74	172.3	24.2	34	231.7	32.6	94	291.1	40.9
55	54.5	7.7	15	113.9	16.0	75	173.3	24.4	35	232.7	32.7	95	292.1	41.1
56	55.5	7.8	16	114.9	16.1	76	174.3	24.5	36	233.7	32.8	96	293.1	41.2
57	56.4	7.9	17	115.9	16.3	77	175.3	24.6	37	234.7	33.0	97	294.1	41.3
58	57.4	8.1	18	116.9	16.4	78	176.3	24.8	38	235.7	33.1	98	295.1	41.5
59	58.4	8.2	19	117.8	16.6	79	177.3	24.9	39	236.7	33.3	99	296.1	41.6
60	59.4	8.4	20	118.8	16.7	80	178.2	25.1	40	237.7	33.4	300	297.1	41.8
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

82° (98°, 262°, 278°).

TABLE 2.

Difference of Latitude and Departure for 8° (172°, 188°, 352°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	298.0	41.9	361	357.5	50.2	421	416.9	58.6	481	476.3	66.9	541	535.7	75.2
02	299.0	42.0	62	358.5	50.4	22	417.9	58.7	82	477.3	67.1	42	536.7	75.4
03	300.0	42.2	63	359.4	50.5	23	418.9	58.9	83	478.3	67.2	43	537.7	75.5
04	301.0	42.3	64	360.4	50.7	24	419.8	59.0	84	479.3	67.4	44	538.7	75.7
05	302.0	42.5	65	361.4	50.8	25	420.8	59.2	85	480.3	67.5	45	539.7	75.8
06	303.0	42.6	66	362.4	50.9	26	421.8	59.3	86	481.2	67.6	46	540.6	75.9
07	304.0	42.7	67	363.4	51.1	27	422.8	59.4	87	482.2	67.8	47	541.6	76.1
08	305.0	42.9	68	364.4	51.2	28	423.8	59.6	88	483.2	67.9	48	542.6	76.2
09	306.0	43.0	69	365.4	51.4	29	424.8	59.7	89	484.2	68.1	49	543.6	76.4
10	307.0	43.1	70	366.4	51.5	30	425.8	59.8	90	485.2	68.2	50	544.6	76.5
311	307.9	43.3	371	367.4	51.6	431	426.8	60.0	491	486.2	68.3	551	545.6	76.6
12	308.9	43.4	72	368.4	51.8	32	427.8	60.1	92	487.2	68.5	52	546.6	76.8
13	309.9	43.6	73	369.3	51.9	33	428.8	60.3	93	488.2	68.6	53	547.6	76.9
14	310.9	43.7	74	370.3	52.1	34	429.8	60.4	94	489.2	68.8	54	548.6	77.1
15	311.9	43.8	75	371.3	52.2	35	430.7	60.5	95	490.2	68.9	55	549.6	77.2
16	312.9	44.0	76	372.3	52.3	36	431.7	60.7	96	491.2	69.0	56	550.6	77.4
17	313.9	44.1	77	373.3	52.5	37	432.7	60.8	97	492.1	69.2	57	551.5	77.5
18	314.9	44.3	78	374.3	52.6	38	433.7	61.0	98	493.1	69.3	58	552.5	77.6
19	315.9	44.4	79	375.3	52.7	39	434.7	61.1	99	494.1	69.5	59	553.5	77.8
20	316.9	44.5	80	376.3	52.9	40	435.7	61.2	500	495.1	69.6	60	554.5	77.9
321	317.9	44.7	381	377.3	53.0	441	436.7	61.4	501	496.1	69.7	561	555.5	78.1
22	318.8	44.8	82	378.3	53.2	42	437.7	61.5	02	497.1	69.9	62	556.5	78.2
23	319.8	45.0	83	379.2	53.3	43	438.7	61.7	03	498.1	70.0	63	557.5	78.3
24	320.8	45.1	84	380.2	53.4	44	439.7	61.8	04	499.1	70.2	64	558.5	78.5
25	321.8	45.2	85	381.2	53.6	45	440.6	61.9	05	500.1	70.3	65	559.5	78.6
26	322.8	45.4	86	382.2	53.7	46	441.6	62.1	06	501.0	70.4	66	560.5	78.8
27	323.8	45.5	87	383.2	53.9	47	442.6	62.2	07	502.0	70.6	67	561.5	78.9
28	324.8	45.7	88	384.2	54.0	48	443.6	62.4	08	503.0	70.7	68	562.5	79.0
29	325.8	45.8	89	385.2	54.1	49	444.6	62.5	09	504.0	70.8	69	563.5	79.1
30	326.8	45.9	90	386.2	54.3	50	445.6	62.6	10	505.0	70.9	70	564.5	79.3
331	327.8	46.1	391	387.2	54.4	451	446.6	62.8	511	506.0	71.1	571	565.4	79.4
32	328.7	46.2	92	388.2	54.6	52	447.6	62.9	12	507.0	71.2	72	566.4	79.6
33	329.7	46.3	93	389.1	54.7	53	448.6	63.0	13	508.0	71.4	73	567.4	79.7
34	330.7	46.5	94	390.1	54.8	54	449.6	63.2	14	509.0	71.5	74	568.4	79.8
35	331.7	46.6	95	391.1	55.0	55	450.5	63.3	15	510.0	71.6	75	569.4	80.0
36	332.7	46.8	96	392.1	55.1	56	451.5	63.5	16	510.9	71.8	76	570.4	80.1
37	333.7	46.9	97	393.1	55.3	57	452.5	63.6	17	511.9	71.9	77	571.4	80.2
38	334.7	47.0	98	394.1	55.4	58	453.5	63.7	18	512.9	72.0	78	572.4	80.4
39	335.7	47.2	99	395.1	55.5	59	454.5	63.9	19	513.9	72.2	79	573.4	80.5
40	336.7	47.3	400	396.1	55.7	60	455.5	64.0	20	514.9	72.3	80	574.4	80.6
341	337.7	47.5	401	397.1	55.8	461	456.5	64.2	521	515.9	72.4	581	575.4	80.8
42	338.6	47.6	02	398.1	56.0	62	457.5	64.3	22	516.9	72.6	82	576.4	80.9
43	339.6	47.7	03	399.1	56.1	63	458.5	64.4	23	517.9	72.8	83	577.4	81.1
44	340.6	47.9	04	400.0	56.2	64	459.5	64.6	24	518.9	73.0	84	578.4	81.3
45	341.6	48.0	05	401.0	56.4	65	460.4	64.7	25	519.9	73.1	85	579.4	81.4
46	342.6	48.2	06	402.0	56.5	66	461.4	64.9	26	520.9	73.2	86	580.3	81.6
47	343.6	48.3	07	403.0	56.6	67	462.4	65.0	27	521.8	73.4	87	581.3	81.7
48	344.6	48.4	08	404.0	56.8	68	463.4	65.1	28	522.8	73.5	88	582.3	81.8
49	345.6	48.6	09	405.0	56.9	69	464.4	65.3	29	523.8	73.7	89	583.3	82.0
50	346.6	48.7	10	406.0	57.1	70	465.4	65.4	30	524.8	73.8	90	584.3	82.1
351	347.6	48.9	411	407.0	57.2	471	466.4	65.6	531	525.8	73.9	591	585.3	82.2
52	348.5	49.0	12	408.0	57.3	72	467.4	65.7	32	526.8	74.1	92	586.3	82.4
53	349.5	49.1	13	409.0	57.5	73	468.4	65.8	33	527.8	74.2	93	587.3	82.5
54	350.5	49.3	14	409.9	57.6	74	469.4	66.0	34	528.8	74.3	94	588.3	82.6
55	351.5	49.4	15	410.9	57.8	75	470.4	66.1	35	529.8	74.5	95	589.3	82.8
56	352.5	49.5	16	411.9	57.9	76	471.3	66.2	36	530.8	74.6	96	590.3	83.0
57	353.5	49.7	17	412.9	58.0	77	472.3	66.4	37	531.7	74.7	97	591.2	83.1
58	354.5	49.8	18	413.9	58.2	78	473.3	66.5	38	532.7	74.9	98	592.2	83.2
59	355.5	50.0	19	414.9	58.3	79	474.3	66.7	39	533.7	75.0	99	593.2	83.3
60	356.5	50.1	20	415.9	58.5	80	475.3	66.8	40	534.7	75.1	600	594.2	83.5
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

82° (98°, 262°, 278°).

TABLE 2.

Difference of Latitude and Departure for 9° (171°, 189°, 351°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.2	61	60.2	9.5	121	119.5	18.9	181	178.8	28.3	241	238.0	37.7
2	2.0	0.3	62	61.2	9.7	22	120.5	19.1	82	179.8	28.5	42	239.0	37.9
3	3.0	0.5	63	62.2	9.9	23	121.5	19.2	83	180.7	28.6	43	240.0	38.0
4	4.0	0.6	64	63.2	10.0	24	122.5	19.4	84	181.7	28.8	44	241.0	38.2
5	4.9	0.8	65	64.2	10.2	25	123.5	19.6	85	182.7	28.9	45	242.0	38.3
6	5.9	0.9	66	65.2	10.3	26	124.4	19.7	86	183.7	29.1	46	243.0	38.5
7	6.9	1.1	67	66.2	10.5	27	125.4	19.9	87	184.7	29.3	47	244.0	38.6
8	7.9	1.3	68	67.2	10.6	28	126.4	20.0	88	185.7	29.4	48	244.9	38.8
9	8.9	1.4	69	68.2	10.8	29	127.4	20.2	89	186.7	29.6	49	245.9	39.0
10	9.9	1.6	70	69.1	11.0	30	128.4	20.3	90	187.7	29.7	50	246.9	39.1
11	10.9	1.7	71	70.1	11.1	131	129.4	20.5	191	188.6	29.9	251	247.9	39.3
12	11.9	1.9	72	71.1	11.3	32	130.4	20.6	92	189.6	30.0	52	248.9	39.4
13	12.8	2.0	73	72.1	11.4	33	131.4	20.8	93	190.6	30.2	53	249.9	39.6
14	13.8	2.2	74	73.1	11.6	34	132.4	21.0	94	191.6	30.3	54	250.9	39.7
15	14.8	2.3	75	74.1	11.7	35	133.3	21.1	95	192.6	30.5	55	251.9	39.9
16	15.8	2.5	76	75.1	11.9	36	134.3	21.3	96	193.6	30.7	56	252.8	40.0
17	16.8	2.7	77	76.1	12.0	37	135.3	21.4	97	194.6	30.8	57	253.8	40.2
18	17.8	2.8	78	77.0	12.2	38	136.3	21.6	98	195.6	31.0	58	254.8	40.4
19	18.8	3.0	79	78.0	12.4	39	137.3	21.7	99	196.5	31.1	59	255.8	40.5
20	19.8	3.1	80	79.0	12.5	40	138.3	21.9	200	197.5	31.3	60	256.8	40.7
21	20.7	3.3	81	80.0	12.7	141	139.3	22.1	201	198.5	31.4	261	257.8	40.8
22	21.7	3.4	82	81.0	12.8	42	140.3	22.2	02	199.5	31.6	62	258.8	41.0
23	22.7	3.6	83	82.0	13.0	43	141.2	22.4	03	200.5	31.8	63	259.8	41.1
24	23.7	3.8	84	83.0	13.1	44	142.2	22.5	04	201.5	31.9	64	260.7	41.3
25	24.7	3.9	85	84.0	13.3	45	143.2	22.7	05	202.5	32.1	65	261.7	41.5
26	25.7	4.1	86	84.9	13.5	46	144.2	22.8	06	203.5	32.2	66	262.7	41.6
27	26.7	4.2	87	85.9	13.6	47	145.2	23.0	07	204.5	32.4	67	263.7	41.8
28	27.7	4.4	88	86.9	13.8	48	146.2	23.2	08	205.4	32.5	68	264.7	41.9
29	28.6	4.5	89	87.9	13.9	49	147.2	23.3	09	206.4	32.7	69	265.7	42.1
30	29.6	4.7	90	88.9	14.1	50	148.2	23.5	10	207.4	32.9	70	266.7	42.2
31	30.6	4.8	91	89.9	14.2	151	149.1	23.6	211	208.4	33.0	271	267.7	42.4
32	31.6	5.0	92	90.9	14.4	52	150.1	23.8	12	209.4	33.2	72	268.7	42.6
33	32.6	5.2	93	91.9	14.5	53	151.1	23.9	13	210.4	33.3	73	269.6	42.7
34	33.6	5.3	94	92.8	14.7	54	152.1	24.1	14	211.4	33.5	74	270.6	42.9
35	34.6	5.5	95	93.8	14.9	55	153.1	24.2	15	212.4	33.6	75	271.6	43.0
36	35.6	5.6	96	94.8	15.0	56	154.1	24.4	16	213.3	33.8	76	272.6	43.2
37	36.5	5.8	97	95.8	15.2	57	155.1	24.6	17	214.3	33.9	77	273.6	43.3
38	37.5	5.9	98	96.8	15.3	58	156.1	24.7	18	215.3	34.1	78	274.6	43.5
39	38.5	6.1	99	97.8	15.5	59	157.0	24.9	19	216.3	34.3	79	275.6	43.6
40	39.5	6.3	100	98.8	15.6	60	158.0	25.0	20	217.3	34.4	80	276.6	43.8
41	40.5	6.4	101	99.8	15.8	161	159.0	25.2	221	218.3	34.6	281	277.5	44.0
42	41.5	6.6	02	100.7	16.0	62	160.0	25.3	22	219.3	34.7	82	278.5	44.1
43	42.5	6.7	03	101.7	16.1	63	161.0	25.5	23	220.3	34.9	83	279.5	44.3
44	43.5	6.9	04	102.7	16.3	64	162.0	25.7	24	221.2	35.0	84	280.5	44.4
45	44.4	7.0	05	103.7	16.4	65	163.0	25.8	25	222.2	35.2	85	281.5	44.6
46	45.4	7.2	06	104.7	16.6	66	164.0	26.0	26	223.2	35.4	86	282.5	44.7
47	46.4	7.4	07	105.7	16.7	67	164.9	26.1	27	224.2	35.5	87	283.5	44.9
48	47.4	7.5	08	106.7	16.9	68	165.9	26.3	28	225.2	35.7	88	284.5	45.1
49	48.4	7.7	09	107.7	17.1	69	166.9	26.4	29	226.2	35.8	89	285.4	45.2
50	49.4	7.8	10	108.6	17.2	70	167.9	26.6	30	227.2	36.0	90	286.4	45.4
51	50.4	8.0	111	109.6	17.4	171	168.9	26.8	231	228.2	36.1	291	287.4	45.5
52	51.4	8.1	12	110.6	17.5	72	169.9	26.9	32	229.1	36.3	92	288.4	45.7
53	52.3	8.3	13	111.6	17.7	73	170.9	27.1	33	230.1	36.4	93	289.4	45.8
54	53.3	8.4	14	112.6	17.8	74	171.9	27.2	34	231.1	36.6	94	290.4	46.0
55	54.3	8.6	15	113.6	18.0	75	172.8	27.4	35	232.1	36.8	95	291.4	46.1
56	55.3	8.8	16	114.6	18.1	76	173.8	27.5	36	233.1	36.9	96	292.4	46.3
57	56.3	8.9	17	115.6	18.3	77	174.8	27.7	37	234.1	37.1	97	293.3	46.5
58	57.3	9.1	18	116.5	18.5	78	175.8	27.8	38	235.1	37.2	98	294.3	46.6
59	58.3	9.2	19	117.5	18.6	79	176.8	28.0	39	236.1	37.4	99	295.3	46.8
60	59.3	9.4	20	118.5	18.8	80	177.8	28.2	40	237.0	37.5	300	296.3	46.9
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

81° (99°, 261°, 279°).

TABLE 2.

Difference of Latitude and Departure for 9° (171°, 189°, 351°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	297.3	47.1	361	356.6	56.5	421	415.8	65.9	481	475.1	75.2	541	534.4	84.6
02	298.3	47.2	62	357.5	56.7	22	416.8	66.0	82	476.1	75.3	42	535.4	84.7
03	299.3	47.4	63	358.5	56.8	23	417.8	66.2	83	477.1	75.5	43	536.3	84.9
04	300.3	47.6	64	359.5	56.9	24	418.8	66.3	84	478.0	75.6	44	537.3	85.1
05	301.2	47.7	65	360.5	57.1	25	419.8	66.5	85	479.0	75.8	45	538.3	85.3
06	302.2	47.9	66	361.5	57.3	26	420.8	66.6	86	480.0	75.9	46	539.3	85.4
07	303.2	48.0	67	362.5	57.4	27	421.7	66.8	87	481.0	76.1	47	540.3	85.6
08	304.2	48.2	68	363.5	57.6	28	422.7	67.0	88	482.0	76.2	48	541.3	85.7
09	305.2	48.3	69	364.5	57.7	29	423.7	67.1	89	483.0	76.4	49	542.3	85.9
10	306.2	48.5	70	365.4	57.9	30	424.7	67.3	90	484.0	76.5	50	543.3	86.0
311	307.2	48.7	371	366.4	58.1	431	425.7	67.4	491	485.0	76.7	551	544.3	86.2
12	308.2	48.8	72	367.4	58.2	32	426.7	67.6	92	485.9	76.8	52	545.2	86.3
13	309.1	49.0	73	368.4	58.4	33	427.7	67.7	93	486.9	77.0	53	546.2	86.5
14	310.1	49.1	74	369.4	58.5	34	428.7	67.9	94	487.9	77.1	54	547.2	86.6
15	311.1	49.3	75	370.4	58.7	35	429.6	68.1	95	488.9	77.3	55	548.2	86.8
16	312.1	49.4	76	371.4	58.8	36	430.6	68.2	96	489.9	77.5	56	549.2	87.0
17	313.1	49.6	77	372.4	59.0	37	431.6	68.4	97	490.9	77.7	57	550.2	87.1
18	314.1	49.8	78	373.3	59.1	38	432.6	68.5	98	491.9	77.9	58	551.2	87.3
19	315.1	49.9	79	374.3	59.3	39	433.6	68.7	99	492.9	78.0	59	552.2	87.4
20	316.1	50.1	80	375.3	59.5	40	434.6	68.8	500	493.8	78.2	60	553.1	87.6
321	317.0	50.2	381	376.3	59.6	441	435.6	69.0	501	494.8	78.4	561	554.1	87.7
22	318.0	50.4	82	377.3	59.8	42	436.6	69.1	02	495.8	78.5	62	555.1	87.9
23	319.0	50.5	83	378.3	59.9	43	437.5	69.3	03	496.8	78.7	63	556.1	88.0
24	320.0	50.7	84	379.3	60.1	44	438.5	69.5	04	497.8	78.8	64	557.1	88.2
25	321.0	50.8	85	380.3	60.2	45	439.5	69.6	05	498.8	79.0	65	558.1	88.3
26	322.0	51.0	86	381.2	60.4	46	440.5	69.8	06	499.8	79.1	66	559.1	88.5
27	323.0	51.2	87	382.2	60.5	47	441.5	69.9	07	500.8	79.2	67	560.1	88.6
28	324.0	51.3	88	383.2	60.7	48	442.5	70.1	08	501.7	79.4	68	561.0	88.8
29	324.9	51.5	89	384.2	60.9	49	443.5	70.2	09	502.7	79.5	69	562.0	88.9
30	325.9	51.7	90	385.2	61.0	50	444.5	70.4	10	503.7	79.7	70	563.0	89.1
331	326.9	51.8	391	386.2	61.2	451	445.4	70.6	511	504.7	79.8	571	564.0	89.2
32	327.9	51.9	92	387.2	61.3	52	446.4	70.7	12	505.7	80.1	72	565.0	89.4
33	328.9	52.1	93	388.2	61.5	53	447.4	70.9	13	506.7	80.2	73	566.0	89.5
34	329.9	52.3	94	389.1	61.6	54	448.4	71.0	14	507.7	80.3	74	567.0	89.7
35	330.9	52.4	95	390.1	61.8	55	449.4	71.2	15	508.7	80.5	75	568.0	89.9
36	331.9	52.6	96	391.1	62.0	56	450.4	71.3	16	509.6	80.6	76	568.9	90.1
37	332.8	52.7	97	392.1	62.1	57	451.4	71.5	17	510.6	80.8	77	569.9	90.2
38	333.8	52.9	98	393.1	62.3	58	452.4	71.7	18	511.6	80.9	78	570.9	90.3
39	334.8	53.0	99	394.1	62.4	59	453.3	71.8	19	512.6	81.1	79	571.9	90.5
40	335.8	53.2	400	395.1	62.6	60	454.3	72.0	20	513.6	81.3	80	572.9	90.7
341	336.8	53.3	401	396.1	62.7	461	455.3	72.1	521	514.6	81.4	581	573.9	90.9
42	337.8	53.5	02	397.0	62.9	62	456.3	72.3	22	515.6	81.6	82	574.9	91.0
43	338.8	53.7	03	398.0	63.0	63	457.3	72.4	23	516.6	81.8	83	575.9	91.2
44	339.8	53.8	04	399.0	63.2	64	458.3	72.6	24	517.6	81.9	84	576.9	91.3
45	340.8	54.0	05	400.0	63.4	65	459.3	72.7	25	518.6	82.1	85	577.9	91.5
46	341.7	54.1	06	401.0	63.5	66	460.3	72.9	26	519.5	82.3	86	578.8	91.7
47	342.7	54.3	07	402.0	63.7	67	461.2	73.1	27	520.5	82.4	87	579.8	91.8
48	343.7	54.4	08	403.0	63.8	68	462.2	73.2	28	521.5	82.6	88	580.8	92.0
49	344.7	54.6	09	404.0	64.0	69	463.2	73.4	29	522.5	82.7	89	581.8	92.1
50	345.7	54.8	10	405.0	64.1	70	464.2	73.5	30	523.5	82.9	90	582.8	92.2
351	346.7	54.9	411	405.9	64.3	471	465.2	73.7	531	524.5	83.1	591	583.8	92.4
52	347.7	55.1	12	406.9	64.5	72	466.2	73.8	32	525.5	83.2	92	584.8	92.5
53	348.7	55.2	13	407.9	64.6	73	467.2	74.0	33	526.5	83.4	93	585.7	92.7
54	349.6	55.4	14	408.9	64.8	74	468.2	74.2	34	527.5	83.5	94	586.7	92.9
55	350.6	55.5	15	409.9	64.9	75	469.2	74.3	35	528.4	83.7	95	587.7	93.1
56	351.6	55.7	16	410.9	65.1	76	470.1	74.5	36	529.4	83.8	96	588.7	93.2
57	352.6	55.9	17	411.9	65.2	77	471.1	74.6	37	530.4	84.0	97	589.7	93.4
58	353.6	56.0	18	412.9	65.4	78	472.1	74.8	38	531.4	84.1	98	590.7	93.5
59	354.6	56.2	19	413.8	65.6	79	473.1	74.9	39	532.4	84.3	99	591.7	93.7
60	355.6	56.3	20	414.8	65.7	80	474.1	75.0	40	533.4	84.4	600	592.6	93.8
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

81° (99°, 261°, 279°).

TABLE 2.

Difference of Latitude and Departure for 10° (170°, 190°, 350°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.2	61	60.1	10.6	121	119.2	21.0	181	178.3	31.4	241	237.3	41.8
2	2.0	0.3	62	61.1	10.8	22	120.1	21.2	82	179.2	31.6	42	238.3	42.0
3	3.0	0.5	63	62.0	10.9	23	121.1	21.4	83	180.2	31.8	43	239.3	42.2
4	3.9	0.7	64	63.0	11.1	24	122.1	21.5	84	181.2	32.0	44	240.3	42.4
5	4.9	0.9	65	64.0	11.3	25	123.1	21.7	85	182.2	32.1	45	241.3	42.5
6	5.9	1.0	66	65.0	11.5	26	124.1	21.9	86	183.2	32.3	46	242.3	42.7
7	6.9	1.2	67	66.0	11.6	27	125.1	22.1	87	184.2	32.5	47	243.2	42.9
8	7.9	1.4	68	67.0	11.8	28	126.1	22.2	88	185.1	32.6	48	244.2	43.1
9	8.9	1.6	69	68.0	12.0	29	127.0	22.4	89	186.1	32.8	49	245.2	43.2
10	9.8	1.7	70	68.9	12.2	30	128.0	22.6	90	187.1	33.0	50	246.2	43.4
11	10.8	1.9	71	69.9	12.3	131	129.0	22.7	191	188.1	33.2	251	247.2	43.6
12	11.8	2.1	72	70.9	12.5	32	130.0	22.9	92	189.1	33.3	52	248.2	43.8
13	12.8	2.3	73	71.9	12.7	33	131.0	23.1	93	190.1	33.5	53	249.2	43.9
14	13.8	2.4	74	72.9	12.8	34	132.0	23.3	94	191.1	33.7	54	250.1	44.1
15	14.8	2.6	75	73.9	13.0	35	132.9	23.4	95	192.0	33.9	55	251.1	44.3
16	15.8	2.8	76	74.8	13.2	36	133.9	23.6	96	193.0	34.0	56	252.1	44.5
17	16.7	3.0	77	75.8	13.4	37	134.9	23.8	97	194.0	34.2	57	253.1	44.6
18	17.7	3.1	78	76.8	13.5	38	135.9	24.0	98	195.0	34.4	58	254.1	44.8
19	18.7	3.3	79	77.8	13.7	39	136.9	24.1	99	196.0	34.6	59	255.1	45.0
20	19.7	3.5	80	78.8	13.9	40	137.9	24.3	200	197.0	34.7	60	256.1	45.1
21	20.7	3.6	81	79.8	14.1	141	138.9	24.5	201	197.9	34.9	261	257.0	45.3
22	21.7	3.8	82	80.8	14.2	42	139.8	24.7	02	198.9	35.1	62	258.0	45.5
23	22.7	4.0	83	81.7	14.4	43	140.8	24.8	03	199.9	35.3	63	259.0	45.7
24	23.6	4.2	84	82.7	14.6	44	141.8	25.0	04	200.9	35.4	64	260.0	45.8
25	24.6	4.3	85	83.7	14.8	45	142.8	25.2	05	201.9	35.6	65	261.0	46.0
26	25.6	4.5	86	84.7	14.9	46	143.8	25.4	06	202.9	35.8	66	262.0	46.2
27	26.6	4.7	87	85.7	15.1	47	144.8	25.5	07	203.9	35.9	67	262.9	46.4
28	27.6	4.9	88	86.7	15.3	48	145.8	25.7	08	204.8	36.1	68	263.9	46.5
29	28.6	5.0	89	87.6	15.5	49	146.7	25.9	09	205.8	36.3	69	264.9	46.7
30	29.5	5.2	90	88.6	15.6	50	147.7	26.0	10	206.8	36.5	70	265.9	46.9
31	30.5	5.4	91	89.6	15.8	151	148.7	26.2	211	207.8	36.6	271	266.9	47.1
32	31.5	5.6	92	90.6	16.0	52	149.7	26.4	12	208.8	36.8	72	267.9	47.2
33	32.5	5.7	93	91.6	16.1	53	150.7	26.6	13	209.8	37.0	73	268.9	47.4
34	33.5	5.9	94	92.6	16.3	54	151.7	26.7	14	210.7	37.2	74	269.8	47.6
35	34.5	6.1	95	93.6	16.5	55	152.6	26.9	15	211.7	37.3	75	270.8	47.8
36	35.5	6.3	96	94.5	16.7	56	153.6	27.1	16	212.7	37.5	76	271.8	47.9
37	36.4	6.4	97	95.5	16.8	57	154.6	27.3	17	213.7	37.7	77	272.8	48.1
38	37.4	6.6	98	96.5	17.0	58	155.6	27.4	18	214.7	37.9	78	273.8	48.3
39	38.4	6.8	99	97.5	17.2	59	156.6	27.6	19	215.7	38.0	79	274.8	48.4
40	39.4	6.9	100	98.5	17.4	60	157.6	27.8	20	216.7	38.2	80	275.7	48.6
41	40.4	7.1	101	99.5	17.5	161	158.6	28.0	221	217.6	38.4	281	276.7	48.8
42	41.4	7.3	02	100.5	17.7	62	159.5	28.1	22	218.6	38.5	82	277.7	49.0
43	42.3	7.5	03	101.4	17.9	63	160.5	28.3	23	219.6	38.7	83	278.7	49.1
44	43.3	7.6	04	102.4	18.1	64	161.5	28.5	24	220.6	38.9	84	279.7	49.3
45	44.3	7.8	05	103.4	18.2	65	162.5	28.7	25	221.6	39.1	85	280.7	49.5
46	45.3	8.0	06	104.4	18.4	66	163.5	28.8	26	222.6	39.2	86	281.7	49.7
47	46.3	8.2	07	105.4	18.6	67	164.5	29.0	27	223.6	39.4	87	282.6	49.8
48	47.3	8.3	08	106.4	18.8	68	165.4	29.2	28	224.5	39.6	88	283.6	50.0
49	48.3	8.5	09	107.3	18.9	69	166.4	29.3	29	225.5	39.8	89	284.6	50.2
50	49.2	8.7	10	108.3	19.1	70	167.4	29.5	30	226.5	39.9	90	285.6	50.4
51	50.2	8.9	111	109.3	19.3	171	168.4	29.7	231	227.5	40.1	291	286.6	50.5
52	51.2	9.0	12	110.3	19.4	72	169.4	29.9	32	228.5	40.3	92	287.6	50.7
53	52.2	9.2	13	111.3	19.6	73	170.4	30.0	33	229.5	40.5	93	288.5	50.9
54	53.2	9.4	14	112.3	19.8	74	171.4	30.2	34	230.4	40.6	94	289.5	51.1
55	54.2	9.6	15	113.3	20.0	75	172.3	30.4	35	231.4	40.8	95	290.5	51.2
56	55.1	9.7	16	114.2	20.1	76	173.3	30.6	36	232.4	41.0	96	291.5	51.4
57	56.1	9.9	17	115.2	20.3	77	174.3	30.7	37	233.4	41.2	97	292.5	51.6
58	57.1	10.1	18	116.2	20.5	78	175.3	30.9	38	234.4	41.3	98	293.5	51.7
59	58.1	10.2	19	117.2	20.7	79	176.3	31.1	39	235.4	41.5	99	294.5	51.9
60	59.1	10.4	20	118.2	20.8	80	177.3	31.3	40	236.4	41.7	300	295.4	52.1
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

80° (100°, 260°, 280°).

TABLE 2.

Difference of Latitude and Departure for 10° (170°, 190°, 350°)

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	296.4	52.3	361	355.5	62.7	421	414.6	73.1	481	473.7	83.5	541	532.8	93.9
02	297.4	52.5	62	356.5	62.9	22	415.6	73.3	82	474.7	83.7	42	533.8	94.1
03	298.4	52.6	63	357.5	63.0	23	416.6	73.5	83	475.7	83.9	43	534.8	94.3
04	299.4	52.8	64	358.5	63.2	24	417.6	73.6	84	476.6	84.1	44	535.7	94.5
05	300.4	53.0	65	359.5	63.4	25	418.5	73.8	85	477.6	84.2	45	536.7	94.6
06	301.4	53.1	66	360.4	63.6	26	419.5	74.0	86	478.6	84.4	46	537.7	94.8
07	302.3	53.3	67	361.4	63.7	27	420.5	74.2	87	479.6	84.6	47	538.7	95.0
08	303.3	53.5	68	362.4	63.9	28	421.5	74.3	88	480.6	84.7	48	539.7	95.1
09	304.3	53.7	69	363.4	64.1	29	422.5	74.5	89	481.6	84.9	49	540.7	95.3
10	305.3	53.8	70	364.4	64.3	30	423.5	74.7	90	482.6	85.1	50	541.6	95.5
311	306.3	54.0	371	365.4	64.4	431	424.5	74.9	491	483.5	85.2	551	542.6	95.6
12	307.3	54.2	72	366.4	64.6	32	425.4	75.0	92	484.5	85.4	52	543.6	95.8
13	308.2	54.3	73	367.3	64.8	33	426.4	75.2	93	485.5	85.6	53	544.6	96.0
14	309.2	54.5	74	368.3	65.0	34	427.4	75.4	94	486.5	85.8	54	545.6	96.2
15	310.2	54.7	75	369.3	65.1	35	428.4	75.5	95	487.5	85.9	55	546.6	96.3
16	311.2	54.9	76	370.3	65.3	36	429.4	75.7	96	488.5	86.1	56	547.5	96.5
17	312.2	55.1	77	371.3	65.5	37	430.4	75.9	97	489.4	86.3	57	548.5	96.7
18	313.2	55.2	78	372.3	65.6	38	431.3	76.1	98	490.4	86.5	58	549.5	96.9
19	314.2	55.4	79	373.2	65.8	39	432.3	76.2	99	491.4	86.6	59	550.5	97.0
20	315.1	55.6	80	374.2	66.0	40	433.3	76.4	500	492.4	86.8	60	551.5	97.2
321	316.1	55.8	381	375.2	66.2	441	434.3	76.6	501	493.4	87.0	561	552.5	97.4
22	317.1	55.9	82	376.2	66.3	42	435.3	76.8	02	494.4	87.2	62	553.5	97.6
23	318.1	56.1	83	377.2	66.5	43	436.3	76.9	03	495.3	87.3	63	554.4	97.7
24	319.1	56.3	84	378.2	66.7	44	437.3	77.1	04	496.3	87.5	64	555.4	97.9
25	320.1	56.4	85	379.2	66.9	45	438.2	77.3	05	497.3	87.7	65	556.4	98.1
26	321.0	56.6	86	380.1	67.0	46	439.2	77.5	06	498.3	87.9	66	557.4	98.3
27	322.0	56.8	87	381.1	67.2	47	440.2	77.6	07	499.3	88.0	67	558.4	98.4
28	323.0	57.0	88	382.1	67.4	48	441.2	77.8	08	500.3	88.2	68	559.4	98.6
29	324.0	57.1	89	383.1	67.6	49	442.2	78.0	09	501.3	88.4	69	560.3	98.8
30	325.0	57.3	90	384.1	67.7	50	443.2	78.2	10	502.2	88.6	70	561.3	99.0
331	326.0	57.5	391	385.1	67.9	451	444.2	78.3	511	503.2	88.7	571	562.3	99.1
32	327.0	57.7	92	386.0	68.1	52	445.1	78.5	12	504.2	88.9	72	563.3	99.3
33	327.9	57.8	93	387.0	68.2	53	446.1	78.7	13	505.2	89.1	73	564.3	99.5
34	328.9	58.0	94	388.0	68.4	54	447.1	78.8	14	506.2	89.2	74	565.3	99.6
35	329.9	58.2	95	389.0	68.6	55	448.1	79.0	15	507.2	89.4	75	566.3	99.8
36	330.9	58.4	96	390.0	68.8	56	449.1	79.2	16	508.2	89.6	76	567.2	100.0
37	331.9	58.5	97	391.0	68.9	57	450.1	79.4	17	509.1	89.8	77	568.2	100.2
38	332.9	58.7	98	392.0	69.1	58	451.0	79.5	18	510.1	89.9	78	569.2	100.3
39	333.9	58.9	99	392.9	69.3	59	452.0	79.7	19	511.1	90.1	79	570.2	100.5
40	334.8	59.1	400	393.9	69.5	60	453.0	79.9	20	512.1	90.3	80	571.2	100.7
341	335.8	59.2	401	394.9	69.6	461	454.0	80.1	521	513.1	90.5	581	572.2	100.9
42	336.8	59.4	02	395.9	69.8	62	455.0	80.2	22	514.1	90.6	82	573.2	101.0
43	337.8	59.6	03	396.9	70.0	63	456.0	80.4	23	515.1	90.8	83	574.1	101.2
44	338.8	59.8	04	397.9	70.2	64	457.0	80.6	24	516.0	91.0	84	575.1	101.4
45	339.8	59.9	05	398.9	70.3	65	457.9	80.8	25	517.0	91.2	85	576.1	101.6
46	340.7	60.1	06	399.8	70.5	66	458.9	80.9	26	518.0	91.3	86	577.1	101.7
47	341.7	60.3	07	400.8	70.7	67	459.9	81.1	27	519.0	91.5	87	578.1	101.9
48	342.7	60.4	08	401.8	70.9	68	460.9	81.3	28	520.0	91.7	88	579.1	102.1
49	343.7	60.6	09	402.8	71.0	69	461.9	81.5	29	521.0	91.9	89	580.0	102.3
50	344.7	60.8	10	403.8	71.2	70	462.9	81.6	30	521.9	92.0	90	581.0	102.4
351	345.7	61.0	411	404.8	71.4	471	463.8	81.8	531	522.9	92.2	591	582.0	102.6
52	346.7	61.1	12	405.7	71.6	72	464.8	82.0	32	523.9	92.4	92	583.0	102.8
53	347.6	61.3	13	406.7	71.7	73	465.8	82.1	33	524.9	92.5	93	584.0	102.9
54	348.6	61.5	14	407.7	71.9	74	466.8	82.3	34	525.9	92.7	94	585.0	103.1
55	349.6	61.7	15	408.7	72.1	75	467.8	82.5	35	526.9	92.9	95	586.0	103.3
56	350.6	61.8	16	409.7	72.2	76	468.8	82.7	36	527.9	93.1	96	586.9	103.5
57	351.6	62.0	17	410.7	72.4	77	469.8	82.8	37	528.8	93.2	97	587.9	103.6
58	352.6	62.2	18	411.7	72.6	78	470.7	83.0	38	529.8	93.4	98	588.9	103.8
59	353.5	62 4	19	412.6	72.8	79	471.7	83.2	39	530.8	93.6	99	589.9	104.0
60	354.5	62.5	20	413.6	72.9	80	472.7	83.4	40	531.8	93.8	600	590.9	104.2
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

80° (100°, 260°, 280°).

TABLE 2.

Difference of Latitude and Departure for 11° (169°, 191°, 349°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.2	61	59.9	11.6	121	118.8	23.1	181	177.7	34.5	241	236.6	46.0
2	2.0	0.4	62	60.9	11.8	22	119.8	23.3	82	178.7	34.7	42	237.6	46.2
3	2.9	0.6	63	61.8	12.0	23	120.7	23.5	83	179.6	34.9	43	238.5	46.4
4	3.9	0.8	64	62.8	12.2	24	121.7	23.7	84	180.6	35.1	44	239.5	46.6
5	4.9	1.0	65	63.8	12.4	25	122.7	23.9	85	181.6	35.3	45	240.5	46.7
6	5.9	1.1	66	64.8	12.6	26	123.7	24.0	86	182.6	35.5	46	241.5	46.9
7	6.9	1.3	67	65.8	12.8	27	124.7	24.2	87	183.6	35.7	47	242.5	47.1
8	7.9	1.5	68	66.8	13.0	28	125.6	24.4	88	184.5	35.9	48	243.4	47.3
9	8.8	1.7	69	67.7	13.2	29	126.6	24.6	89	185.5	36.1	49	244.4	47.5
10	9.8	1.9	70	68.7	13.4	30	127.6	24.8	90	186.5	36.3	50	245.4	47.7
11	10.8	2.1	71	69.7	13.5	131	128.6	25.0	191	187.5	36.4	251	246.4	47.9
12	11.8	2.3	72	70.7	13.7	32	129.6	25.2	92	188.5	36.6	52	247.4	48.1
13	12.8	2.5	73	71.7	13.9	33	130.6	25.4	93	189.5	36.8	53	248.4	48.3
14	13.7	2.7	74	72.6	14.1	34	131.5	25.6	94	190.4	37.0	54	249.3	48.5
15	14.7	2.9	75	73.6	14.3	35	132.5	25.8	95	191.4	37.2	55	250.3	48.7
16	15.7	3.1	76	74.6	14.5	36	133.5	26.0	96	192.4	37.4	56	251.3	48.8
17	16.7	3.2	77	75.6	14.7	37	134.5	26.1	97	193.4	37.6	57	252.3	49.0
18	17.7	3.4	78	76.6	14.9	38	135.5	26.3	98	194.4	37.8	58	253.3	49.2
19	18.7	3.6	79	77.5	15.1	39	136.4	26.5	99	195.3	38.0	59	254.2	49.4
20	19.6	3.8	80	78.5	15.3	40	137.4	26.7	200	196.3	38.2	60	255.2	49.6
21	20.6	4.0	81	79.5	15.5	141	138.4	26.9	201	197.3	38.4	261	256.2	49.8
22	21.6	4.2	82	80.5	15.6	42	139.4	27.1	02	198.3	38.5	62	257.2	50.0
23	22.6	4.4	83	81.5	15.8	43	140.4	27.3	03	199.3	38.7	63	258.2	50.2
24	23.6	4.6	84	82.5	16.0	44	141.4	27.5	04	200.3	38.9	64	259.1	50.4
25	24.5	4.8	85	83.4	16.2	45	142.3	27.7	05	201.2	39.1	65	260.1	50.6
26	25.5	5.0	86	84.4	16.4	46	143.3	27.9	06	202.2	39.3	66	261.1	50.8
27	26.5	5.2	87	85.4	16.6	47	144.3	28.0	07	203.2	39.5	67	262.1	50.9
28	27.5	5.3	88	86.4	16.8	48	145.3	28.2	08	204.2	39.7	68	263.1	51.1
29	28.5	5.5	89	87.4	17.0	49	146.3	28.4	09	205.2	39.9	69	264.1	51.3
30	29.4	5.7	90	88.3	17.2	50	147.2	28.6	10	206.1	40.1	70	265.0	51.5
31	30.4	5.9	91	89.3	17.4	151	148.2	28.8	211	207.1	40.3	271	266.0	51.7
32	31.4	6.1	92	90.3	17.6	52	149.2	29.0	12	208.1	40.5	72	267.0	51.9
33	32.4	6.3	93	91.3	17.7	53	150.2	29.2	13	209.1	40.6	73	268.0	52.1
34	33.4	6.5	94	92.3	17.9	54	151.2	29.4	14	210.1	40.8	74	269.0	52.3
35	34.4	6.7	95	93.3	18.1	55	152.2	29.6	15	211.0	41.0	75	269.9	52.5
36	35.3	6.9	96	94.2	18.3	56	153.1	29.8	16	212.0	41.2	76	270.9	52.7
37	36.3	7.1	97	95.2	18.5	57	154.1	30.0	17	213.0	41.4	77	271.9	52.9
38	37.3	7.3	98	96.2	18.7	58	155.1	30.1	18	214.0	41.6	78	272.9	53.0
39	38.3	7.4	99	97.2	18.9	59	156.1	30.3	19	215.0	41.8	79	273.9	53.2
40	39.3	7.6	100	98.2	19.1	60	157.1	30.5	20	216.0	42.0	80	274.9	53.4
41	40.2	7.8	101	99.1	19.3	161	158.0	30.7	221	216.9	42.2	281	275.8	53.6
42	41.2	8.0	02	100.1	19.5	62	159.0	30.9	22	217.9	42.4	82	276.8	53.8
43	42.2	8.2	03	101.1	19.7	63	160.0	31.1	23	218.9	42.6	83	277.8	54.0
44	43.2	8.4	04	102.1	19.8	64	161.0	31.3	24	219.9	42.7	84	278.8	54.2
45	44.2	8.6	05	103.1	20.0	65	162.0	31.5	25	220.9	42.9	85	279.8	54.4
46	45.2	8.8	06	104.1	20.2	66	163.0	31.7	26	221.8	43.1	86	280.7	54.6
47	46.1	9.0	07	105.0	20.4	67	163.9	31.9	27	222.8	43.3	87	281.7	54.8
48	47.1	9.2	08	106.0	20.6	68	164.9	32.1	28	223.8	43.5	88	282.7	55.0
49	48.1	9.3	09	107.0	20.8	69	165.9	32.2	29	224.8	43.7	89	283.7	55.1
50	49.1	9.5	10	108.0	21.0	70	166.9	32.4	30	225.8	43.9	90	284.7	55.3
51	50.1	9.7	111	109.0	21.2	171	167.9	32.6	231	226.8	44.1	291	285.7	55.5
52	51.0	9.9	12	109.9	21.4	72	168.8	32.8	32	227.7	44.3	92	286.6	55.7
53	52.0	10.1	13	110.9	21.6	73	169.8	33.0	33	228.7	44.5	93	287.6	55.9
54	53.0	10.3	14	111.9	21.8	74	170.8	33.2	34	229.7	44.6	94	288.6	56.1
55	54.0	10.5	15	112.9	21.9	75	171.8	33.4	35	230.7	44.8	95	289.6	56.3
56	55.0	10.7	16	113.9	22.1	76	172.8	33.6	36	231.7	45.0	96	290.6	56.5
57	56.0	10.9	17	114.9	22.3	77	173.7	33.8	37	232.6	45.2	97	291.5	56.7
58	56.9	11.1	18	115.8	22.5	78	174.7	34.0	38	233.6	45.4	98	292.5	56.9
59	57.9	11.3	19	116.8	22.7	79	175.7	34.2	39	234.6	45.6	99	293.5	57.1
60	58.9	11.4	20	117.8	22.9	80	176.7	34.3	40	235.6	45.8	300	294.5	57.2
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

79° (101°, 259°, 281°).

TABLE 2.

Difference of Latitude and Departure for 11° (169°, 191°, 349°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	295.4	57.4	361	354.3	68.9	421	413.2	80.3	481	472.1	91.8	541	531.0	103.2
02	296.4	57.6	62	355.3	69.1	22	414.2	80.5	82	473.1	92.0	42	532.0	103.4
03	297.4	57.8	63	356.3	69.3	23	415.2	80.7	83	474.1	92.2	43	533.0	103.6
04	298.4	58.0	64	357.3	69.5	24	416.2	80.9	84	475.1	92.4	44	534.0	103.8
05	299.4	58.2	65	358.3	69.6	25	417.2	81.1	85	476.1	92.6	45	535.0	104.0
06	300.3	58.4	66	359.2	69.8	26	418.1	81.3	86	477.0	92.8	46	535.9	104.2
07	301.3	58.6	67	360.2	70.0	27	419.1	81.5	87	478.0	93.0	47	536.9	104.4
08	302.3	58.8	68	361.2	70.2	28	420.1	81.7	88	479.0	93.2	48	537.9	104.6
09	303.3	59.0	69	362.2	70.4	29	421.1	81.9	89	480.0	93.3	49	538.9	104.8
10	304.3	59.2	70	363.2	70.6	30	422.1	82.1	90	481.0	93.5	50	539.9	105.0
311	305.3	59.3	371	364.1	70.8	431	423.0	82.2	491	481.9	93.6	551	540.8	105.1
12	306.2	59.5	72	365.1	71.0	32	424.0	82.4	92	482.9	93.8	52	541.8	105.3
13	307.2	59.7	73	366.1	71.2	33	425.0	82.6	93	483.9	94.0	53	542.8	105.5
14	308.2	59.9	74	367.1	71.4	34	426.0	82.8	94	484.9	94.2	54	543.8	105.7
15	309.2	60.1	75	368.1	71.6	35	427.0	83.0	95	485.9	94.4	55	544.8	105.9
16	310.2	60.3	76	369.1	71.7	36	423.0	83.2	96	486.9	94.6	56	545.8	106.1
17	311.1	60.5	77	370.0	71.9	37	428.9	83.4	97	487.8	94.8	57	546.7	106.3
18	312.1	60.7	78	371.0	72.1	38	429.9	83.6	98	488.8	95.0	58	547.7	106.5
19	313.1	60.9	79	372.0	72.3	39	430.9	83.8	99	489.8	95.2	59	548.7	106.7
20	314.1	61.1	80	373.0	72.5	40	431.9	84.0	500	490.8	95.4	60	549.7	106.9
321	315.1	61.3	381	374.0	72.7	441	432.9	84.1	501	491.8	95.6	561	550.7	107.1
22	316.1	61.4	82	374.9	72.9	42	433.8	84.3	02	492.7	95.8	62	551.6	107.2
23	317.0	61.6	83	375.9	73.1	43	434.8	84.5	03	493.7	96.0	63	552.6	107.4
24	318.0	61.8	84	376.9	73.3	44	435.8	84.7	04	494.7	96.2	64	553.6	107.6
25	319.0	62.0	85	377.9	73.5	45	436.8	84.9	05	495.7	96.4	65	554.6	107.8
26	320.0	62.2	86	378.9	73.7	46	437.8	85.1	06	496.7	96.6	66	555.6	108.0
27	321.0	62.4	87	379.9	73.8	47	438.8	85.3	07	497.7	96.8	67	556.6	108.2
28	321.9	62.6	88	380.8	74.0	48	439.7	85.5	08	498.6	97.0	68	557.6	108.4
29	322.9	62.8	89	381.8	74.2	49	440.7	85.7	09	499.6	97.2	69	558.6	108.6
30	323.9	63.0	90	382.8	74.4	50	441.7	85.9	10	500.6	97.3	70	559.5	108.8
331	324.9	63.2	391	383.8	74.6	451	442.7	86.1	511	501.6	97.5	571	560.5	109.0
32	325.9	63.4	92	384.8	74.8	52	443.7	86.2	12	502.6	97.6	72	561.5	109.1
33	326.8	63.5	93	385.7	75.0	53	444.6	86.4	13	503.5	97.8	73	562.5	109.3
34	327.8	63.7	94	386.7	75.2	54	445.6	86.6	14	504.5	98.0	74	563.5	109.5
35	328.8	63.9	95	387.7	75.4	55	446.6	86.8	15	505.5	98.2	75	564.5	109.7
36	329.8	64.1	96	388.7	75.6	56	447.6	87.0	16	506.5	98.4	76	565.4	109.9
37	330.8	64.3	97	389.7	75.8	57	448.6	87.2	17	507.5	98.6	77	566.4	110.1
38	331.8	64.5	98	390.7	75.9	58	449.6	87.4	18	508.5	98.8	78	567.4	110.3
39	332.7	64.7	99	391.6	76.1	59	450.5	87.6	19	509.4	99.0	79	568.3	110.5
40	333.7	64.9	400	392.6	76.3	60	451.5	87.8	20	510.4	99.2	80	569.3	110.7
341	334.7	65.1	401	393.6	76.5	461	452.5	88.0	521	511.4	99.4	581	570.3	110.9
42	335.7	65.3	02	394.6	76.7	62	453.5	88.2	22	512.4	99.6	82	571.3	111.1
43	336.7	65.5	03	395.6	76.9	63	454.5	88.3	23	513.4	99.8	83	572.3	111.3
44	337.6	65.6	04	396.5	77.1	64	455.4	88.5	24	514.3	100.0	84	573.2	111.5
45	338.6	65.8	05	397.5	77.3	65	456.4	88.7	25	515.3	100.2	85	574.2	111.7
46	339.6	66.0	06	398.5	77.5	66	457.4	88.9	26	516.3	100.4	86	575.2	111.8
47	340.6	66.2	07	399.5	77.7	67	458.4	89.1	27	517.3	100.6	87	576.2	112.1
48	341.6	66.4	08	400.5	77.9	68	459.4	89.3	28	518.3	100.8	88	577.2	112.3
49	342.6	66.6	09	401.5	78.1	69	460.4	89.5	29	519.3	101.0	89	578.2	112.4
50	343.5	66.8	10	402.4	78.2	70	461.3	89.7	30	520.2	101.2	90	579.1	112.6
351	344.5	67.0	411	403.4	78.4	471	462.3	89.9	531	521.2	101.4	591	580.1	112.8
52	345.5	67.2	12	404.4	78.6	72	463.3	90.1	32	522.2	101.6	92	581.1	113.0
53	346.5	67.4	13	405.4	78.8	73	464.3	90.3	33	523.2	101.7	93	582.1	113.2
54	347.5	67.5	14	406.4	79.0	74	465.3	90.4	34	524.2	101.8	94	583.1	113.3
55	348.4	67.7	15	407.3	79.2	75	466.2	90.6	35	525.1	102.0	95	584.0	113.5
56	349.4	67.9	16	408.3	79.4	76	467.2	90.8	36	526.1	102.2	96	585.0	113.7
57	350.4	68.1	17	409.3	79.6	77	468.2	91.0	37	527.1	102.4	97	586.0	113.9
58	351.4	68.3	18	410.3	79.8	78	469.2	91.2	38	528.1	102.6	98	587.0	114.1
59	352.4	68.5	19	411.3	80.0	79	470.2	91.4	39	529.1	102.8	99	588.0	114.3
60	353.4	68.7	20	412.3	80.1	80	471.1	91.6	40	530.1	103.0	600	589.0	114.5
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

79° (101°, 259°, 281°).

TABLE 2.

Difference of Latitude and Departure for 12° (168°, 192°, 348°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.2	61	59.7	12.7	121	118.4	25.2	181	177.0	37.6	241	235.7	50.1
2	2.0	0.4	62	60.6	12.9	22	119.3	25.4	82	178.0	37.8	42	236.7	50.3
3	2.9	0.6	63	61.6	13.1	23	120.3	25.6	83	179.0	38.0	43	237.7	50.5
4	3.9	0.8	64	62.6	13.3	24	121.3	25.8	84	180.0	38.3	44	238.7	50.7
5	4.9	1.0	65	63.6	13.5	25	122.3	26.0	85	181.0	38.5	45	239.6	50.9
6	5.9	1.2	66	64.6	13.7	26	123.2	26.2	86	181.9	38.7	46	240.6	51.1
7	6.8	1.5	67	65.5	13.9	27	124.2	26.4	87	182.9	38.9	47	241.6	51.4
8	7.8	1.7	68	66.5	14.1	28	125.2	26.6	88	183.9	39.1	48	242.6	51.6
9	8.8	1.9	69	67.5	14.3	29	126.2	26.8	89	184.9	39.3	49	243.6	51.8
10	9.8	2.1	70	68.5	14.6	30	127.2	27.0	90	185.8	39.5	50	244.5	52.0
11	10.8	2.3	71	69.4	14.8	131	128.1	27.2	191	186.8	39.7	251	245.5	52.2
12	11.7	2.5	72	70.4	15.0	32	129.1	27.4	92	187.8	39.9	52	246.5	52.4
13	12.7	2.7	73	71.4	15.2	33	130.1	27.7	93	188.8	40.1	53	247.5	52.6
14	13.7	2.9	74	72.4	15.4	34	131.1	27.9	94	189.8	40.3	54	248.4	52.8
15	14.7	3.1	75	73.4	15.6	35	132.0	28.1	95	190.7	40.5	55	249.4	53.0
16	15.7	3.3	76	74.3	15.8	36	133.0	28.3	96	191.7	40.8	56	250.4	53.2
17	16.6	3.5	77	75.3	16.0	37	134.0	28.5	97	192.7	41.0	57	251.4	53.4
18	17.6	3.7	78	76.3	16.2	38	135.0	28.7	98	193.7	41.2	58	252.4	53.6
19	18.6	4.0	79	77.3	16.4	39	136.0	28.9	99	194.7	41.4	59	253.3	53.8
20	19.6	4.2	80	78.3	16.6	40	136.9	29.1	200	195.6	41.6	60	254.3	54.1
21	20.5	4.4	81	79.2	16.8	141	137.9	29.3	201	196.6	41.8	261	255.3	54.3
22	21.5	4.6	82	80.2	17.0	42	138.9	29.5	02	197.6	42.0	62	256.3	54.5
23	22.5	4.8	83	81.2	17.3	43	139.9	29.7	03	198.6	42.2	63	257.3	54.7
24	23.5	5.0	84	82.2	17.5	44	140.9	29.9	04	199.5	42.4	64	258.2	54.9
25	24.5	5.2	85	83.1	17.7	45	141.8	30.1	05	200.5	42.6	65	259.2	55.1
26	25.4	5.4	86	84.1	17.9	46	142.8	30.4	06	201.5	42.8	66	260.2	55.3
27	26.4	5.6	87	85.1	18.1	47	143.8	30.6	07	202.5	43.0	67	261.2	55.5
28	27.4	5.8	88	86.1	18.3	48	144.8	30.8	08	203.5	43.2	68	262.1	55.7
29	28.4	6.0	89	87.1	18.5	49	145.7	31.0	09	204.4	43.5	69	263.1	55.9
30	29.3	6.2	90	88.0	18.7	50	146.7	31.2	10	205.4	43.7	70	264.1	56.1
31	30.3	6.4	91	89.0	18.9	151	147.7	31.4	211	206.4	43.9	271	265.1	56.3
32	31.3	6.7	92	90.0	19.1	52	148.7	31.6	12	207.4	44.1	72	266.1	56.6
33	32.3	6.9	93	91.0	19.3	53	149.7	31.8	13	208.3	44.3	73	267.0	56.8
34	33.3	7.1	94	91.9	19.5	54	150.6	32.0	14	209.3	44.5	74	268.0	57.0
35	34.2	7.3	95	92.9	19.8	55	151.6	32.2	15	210.3	44.7	75	269.0	57.2
36	35.2	7.5	96	93.9	20.0	56	152.6	32.4	16	211.3	44.9	76	270.0	57.4
37	36.2	7.7	97	94.9	20.2	57	153.6	32.6	17	212.3	45.1	77	270.9	57.6
38	37.2	7.9	98	95.9	20.4	58	154.5	32.9	18	213.2	45.3	78	271.9	57.8
39	38.1	8.1	99	96.8	20.6	59	155.5	33.1	19	214.2	45.5	79	272.9	58.0
40	39.1	8.3	100	97.8	20.8	60	156.5	33.3	20	215.2	45.7	80	273.9	58.2
41	40.1	8.5	101	98.8	21.0	161	157.5	33.5	221	216.2	45.9	281	274.9	58.4
42	41.1	8.7	02	99.8	21.2	62	158.5	33.7	22	217.1	46.2	82	275.8	58.6
43	42.1	8.9	03	100.7	21.4	63	159.4	33.9	23	218.1	46.4	83	276.8	58.8
44	43.0	9.1	04	101.7	21.6	64	160.4	34.1	24	219.1	46.6	84	277.8	59.0
45	44.0	9.4	05	102.7	21.8	65	161.4	34.3	25	220.1	46.8	85	278.8	59.3
46	45.0	9.6	06	103.7	22.0	66	162.4	34.5	26	221.1	47.0	86	279.8	59.5
47	46.0	9.8	07	104.7	22.2	67	163.4	34.7	27	222.0	47.2	87	280.7	59.7
48	47.0	10.0	08	105.7	22.5	68	164.3	34.9	28	223.0	47.4	88	281.7	59.9
49	47.9	10.2	09	106.6	22.7	69	165.3	35.1	29	224.0	47.6	89	282.7	60.1
50	48.9	10.4	10	107.6	22.9	70	166.3	35.3	30	225.0	47.8	90	283.7	60.3
51	49.9	10.6	111	108.6	23.1	171	167.3	35.6	231	226.0	48.0	291	284.6	60.5
52	50.9	10.8	12	109.6	23.3	72	168.2	35.8	32	226.9	48.2	92	285.6	60.7
53	51.8	11.0	13	110.5	23.5	73	169.2	36.0	33	227.9	48.4	93	286.6	60.9
54	52.8	11.2	14	111.5	23.7	74	170.2	36.2	34	228.9	48.7	94	287.6	61.1
55	53.8	11.4	15	112.5	23.9	75	171.2	36.4	35	229.9	48.9	95	288.6	61.3
56	54.8	11.6	16	113.5	24.1	76	172.2	36.6	36	230.8	49.1	96	289.5	61.5
57	55.8	11.9	17	114.4	24.3	77	173.1	36.8	37	231.8	49.3	97	290.5	61.7
58	56.7	12.1	18	115.4	24.5	78	174.1	37.0	38	232.8	49.5	98	291.5	62.0
59	57.7	12.3	19	116.4	24.7	79	175.1	37.2	39	233.8	49.7	99	292.5	62.2
60	58.7	12.5	20	117.4	24.9	80	176.1	37.4	40	234.8	49.9	300	293.4	62.4
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

78° (102°, 258°, 282°).

TABLE 2.

Difference of Latitude and Departure for 12° (168°, 192°, 348°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	294.4	62.6	361	353.1	75.0	421	411.8	87.5	481	470.5	100.0	541	529.2	112.5
02	295.4	62.8	62	354.1	75.2	22	412.8	87.7	82	471.5	100.2	42	530.2	112.7
03	296.4	63.0	63	355.1	75.4	23	413.8	87.9	83	472.5	100.4	43	531.1	112.9
04	297.4	63.2	64	356.0	75.7	24	414.7	88.1	84	473.4	100.6	44	532.1	113.1
05	298.3	63.4	65	357.0	75.9	25	415.7	88.3	85	474.4	100.8	45	533.1	113.3
06	299.3	63.6	66	358.0	76.1	26	416.7	88.6	86	475.4	101.0	46	534.1	113.5
07	300.3	63.8	67	359.0	76.3	27	417.7	88.8	87	476.4	101.2	47	535.1	113.7
08	301.3	64.0	68	360.0	76.5	28	418.6	89.0	88	477.3	101.4	48	536.0	113.9
09	302.2	64.2	69	360.9	76.7	29	419.6	89.2	89	478.3	101.6	49	537.0	114.1
10	303.2	64.4	70	361.9	76.9	30	420.6	89.4	90	479.3	101.9	50	538.0	114.4
311	304.2	64.6	371	362.9	77.1	431	421.6	89.6	491	480.3	102.1	551	538.9	114.6
12	305.2	64.8	72	363.9	77.3	32	422.6	89.8	92	481.2	102.3	52	539.9	114.8
13	306.2	65.1	73	364.8	77.5	33	423.5	90.0	93	482.2	102.5	53	540.9	115.0
14	307.1	65.3	74	365.8	77.7	34	424.5	90.2	94	483.2	102.7	54	541.9	115.2
15	308.1	65.5	75	366.8	77.9	35	425.5	90.4	95	484.2	102.9	55	542.9	115.4
16	309.1	65.7	76	367.8	78.2	36	426.5	90.6	96	485.2	103.1	56	543.8	115.6
17	310.1	65.9	77	368.8	78.4	37	427.5	90.8	97	486.1	103.3	57	544.8	115.8
18	311.1	66.1	78	369.7	78.6	38	428.4	91.0	98	487.1	103.5	58	545.8	116.0
19	312.0	66.3	79	370.7	78.8	39	429.4	91.3	99	488.1	103.8	59	546.8	116.2
20	313.0	66.5	80	371.7	79.0	40	430.4	91.5	500	489.1	104.0	60	547.8	116.4
321	314.0	66.7	381	372.7	79.2	441	431.4	91.7	501	490.0	104.2	561	548.7	116.6
22	315.0	66.9	82	373.7	79.4	42	432.3	91.9	02	491.0	104.4	62	549.7	116.8
23	315.9	67.1	83	374.6	79.6	43	433.3	92.1	03	492.0	104.6	63	550.7	117.0
24	316.9	67.3	84	375.6	79.8	44	434.3	92.3	04	493.0	104.8	64	551.7	117.2
25	317.9	67.6	85	376.6	80.0	45	435.3	92.5	05	494.0	105.0	65	552.7	117.4
26	318.9	67.8	86	377.6	80.2	46	436.3	92.7	06	495.0	105.2	66	553.7	117.6
27	319.9	68.0	87	378.5	80.4	47	437.2	92.9	07	495.9	105.4	67	554.6	117.8
28	320.8	68.2	88	379.5	80.7	48	438.2	93.1	08	496.9	105.6	68	555.6	118.0
29	321.8	68.4	89	380.5	80.9	49	439.2	93.3	09	497.9	105.8	69	556.6	118.2
30	322.8	68.6	90	381.5	81.1	50	440.2	93.5	10	498.9	106.0	70	557.5	118.5
331	323.8	68.8	391	382.5	81.3	451	441.1	93.7	511	499.8	106.2	571	558.5	118.7
32	324.7	69.0	92	383.4	81.5	52	442.1	93.9	12	500.8	106.4	72	559.5	118.9
33	325.7	69.2	93	384.4	81.7	53	443.1	94.1	13	501.8	106.6	73	560.5	119.1
34	326.7	69.4	94	385.4	81.9	54	444.1	94.4	14	502.8	106.8	74	561.5	119.3
35	327.7	69.6	95	386.4	82.1	55	445.1	94.6	15	503.7	107.0	75	562.4	119.5
36	328.7	69.8	96	387.3	82.3	56	446.0	94.8	16	504.7	107.2	76	563.4	119.7
37	329.6	70.0	97	388.3	82.5	57	447.0	95.0	17	505.7	107.4	77	564.4	119.9
38	330.6	70.3	98	389.3	82.7	58	448.0	95.2	18	506.7	107.6	78	565.4	120.1
39	331.6	70.5	99	390.3	82.9	59	449.0	95.4	19	507.7	107.8	79	566.4	120.3
40	332.6	70.7	400	391.3	83.1	60	450.0	95.6	20	508.7	108.1	80	567.4	120.6
341	333.5	70.9	401	392.2	83.4	461	450.9	95.8	521	509.6	108.3	581	568.3	120.8
42	334.5	71.1	02	393.2	83.6	62	451.9	96.0	22	510.6	108.5	82	569.3	121.0
43	335.5	71.3	03	394.2	83.8	63	452.9	96.2	23	511.6	108.7	83	570.3	121.2
44	336.5	71.5	04	395.2	84.0	64	453.9	96.5	24	512.5	108.9	84	571.2	121.4
45	337.5	71.7	05	396.2	84.2	65	454.8	96.7	25	513.5	109.2	85	572.2	121.6
46	338.4	71.9	06	397.1	84.4	66	455.8	96.9	26	514.5	109.4	86	573.2	121.8
47	339.4	72.1	07	398.1	84.6	67	456.8	97.1	27	515.5	109.6	87	574.2	122.0
48	340.4	72.3	08	399.1	84.8	68	457.8	97.3	28	516.5	109.8	88	575.2	122.2
49	341.4	72.5	09	400.1	85.0	69	458.8	97.5	29	517.5	110.0	89	576.2	122.4
50	342.4	72.7	10	401.0	85.2	70	459.7	97.7	30	518.4	110.2	90	577.1	122.6
351	343.3	73.0	411	402.0	85.4	471	460.7	97.9	531	519.4	110.4	591	578.1	122.8
52	344.3	73.2	12	403.0	85.6	72	461.7	98.1	32	520.4	110.6	92	579.1	123.0
53	345.3	73.4	13	404.0	85.8	73	462.7	98.3	33	521.3	110.8	93	580.0	123.2
54	346.3	73.6	14	405.0	86.1	74	463.6	98.5	34	522.3	111.0	94	581.0	123.4
55	347.2	73.8	15	405.9	86.3	75	464.6	98.7	35	523.3	111.2	95	582.0	123.6
56	348.2	74.0	16	406.9	86.5	76	465.6	98.9	36	524.3	111.4	96	583.0	123.9
57	349.2	74.2	17	407.9	86.7	77	466.6	99.1	37	525.3	111.6	97	584.0	124.1
58	350.2	74.4	18	408.9	86.9	78	467.6	99.4	38	526.2	111.8	98	584.9	124.3
59	351.2	74.6	19	409.8	87.1	79	468.5	99.6	39	527.2	112.0	99	585.9	124.5
60	352.1	74.8	20	410.8	87.3	80	469.5	99.8	40	528.2	112.3	600	586.9	124.7
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

78° (102°, 258°, 282°).

TABLE 2.

Difference of Latitude and Departure for 13° (167°, 193°, 347°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.2	61	59.4	13.7	121	117.9	27.2	181	176.4	40.7	241	234.8	54.2
2	1.9	0.4	62	60.4	13.9	22	118.9	27.4	82	177.3	40.9	42	235.8	54.4
3	2.9	0.7	63	61.4	14.2	23	119.8	27.7	83	178.3	41.2	43	236.8	54.7
4	3.9	0.9	64	62.4	14.4	24	120.8	27.9	84	179.3	41.4	44	237.7	54.9
5	4.9	1.1	65	63.3	14.6	25	121.8	28.1	85	180.3	41.6	45	238.7	55.1
6	5.8	1.3	66	64.3	14.8	26	122.8	28.3	86	181.2	41.8	46	239.7	55.3
7	6.8	1.6	67	65.3	15.1	27	123.7	28.6	87	182.2	42.1	47	240.7	55.6
8	7.8	1.8	68	66.3	15.3	28	124.7	28.8	88	183.2	42.3	48	241.6	55.8
9	8.8	2.0	69	67.2	15.5	29	125.7	29.0	89	184.2	42.5	49	242.6	56.0
10	9.7	2.2	70	68.2	15.7	30	126.7	29.2	90	185.1	42.7	50	243.6	56.2
11	10.7	2.5	71	69.2	16.0	131	127.6	29.5	191	186.1	43.0	251	244.6	56.5
12	11.7	2.7	72	70.2	16.2	32	128.6	29.7	92	187.1	43.2	52	245.5	56.7
13	12.7	2.9	73	71.1	16.4	33	129.6	29.9	93	188.1	43.4	53	246.5	56.9
14	13.6	3.1	74	72.1	16.6	34	130.6	30.1	94	189.0	43.6	54	247.5	57.1
15	14.6	3.4	75	73.1	16.9	35	131.5	30.4	95	190.0	43.9	55	248.5	57.4
16	15.6	3.6	76	74.1	17.1	36	132.5	30.6	96	191.0	44.1	56	249.4	57.6
17	16.6	3.8	77	75.0	17.3	37	133.5	30.8	97	192.0	44.3	57	250.4	57.8
18	17.5	4.0	78	76.0	17.5	38	134.5	31.0	98	192.9	44.5	58	251.4	58.0
19	18.5	4.3	79	77.0	17.8	39	135.4	31.3	99	193.9	44.8	59	252.4	58.3
20	19.5	4.5	80	77.9	18.0	40	136.4	31.5	200	194.9	45.0	60	253.3	58.5
21	20.5	4.7	81	78.9	18.2	141	137.4	31.7	201	195.8	45.2	261	254.3	58.7
22	21.4	4.9	82	79.9	18.4	42	138.4	31.9	02	196.8	45.4	62	255.3	58.9
23	22.4	5.2	83	80.9	18.7	43	139.3	32.2	03	197.8	45.7	63	256.3	59.2
24	23.4	5.4	84	81.8	18.9	44	140.3	32.4	04	198.8	45.9	64	257.2	59.4
25	24.4	5.6	85	82.8	19.1	45	141.3	32.6	05	199.7	46.1	65	258.2	59.6
26	25.3	5.8	86	83.8	19.3	46	142.3	32.8	06	200.7	46.3	66	259.2	59.8
27	26.3	6.1	87	84.8	19.6	47	143.2	33.1	07	201.7	46.6	67	260.2	60.1
28	27.3	6.3	88	85.7	19.8	48	144.2	33.3	08	202.7	46.8	68	261.1	60.3
29	28.3	6.5	89	86.7	20.0	49	145.2	33.5	09	203.6	47.0	69	262.1	60.5
30	29.2	6.7	90	87.7	20.2	50	146.2	33.7	10	204.6	47.2	70	263.1	60.7
31	30.2	7.0	91	88.7	20.5	151	147.1	34.0	211	205.6	47.5	271	264.1	61.0
32	31.2	7.2	92	89.6	20.7	52	148.1	34.2	12	206.6	47.7	72	265.0	61.2
33	32.2	7.4	93	90.6	20.9	53	149.1	34.4	13	207.5	47.9	73	266.0	61.4
34	33.1	7.6	94	91.6	21.1	54	150.1	34.6	14	208.5	48.1	74	267.0	61.6
35	34.1	7.9	95	92.6	21.4	55	151.0	34.9	15	209.5	48.4	75	268.0	61.9
36	35.1	8.1	96	93.5	21.6	56	152.0	35.1	16	210.5	48.6	76	268.9	62.1
37	36.1	8.3	97	94.5	21.8	57	153.0	35.3	17	211.4	48.8	77	269.9	62.3
38	37.0	8.5	98	95.5	22.0	58	154.0	35.5	18	212.4	49.0	78	270.9	62.5
39	38.0	8.8	99	96.5	22.3	59	154.9	35.8	19	213.4	49.3	79	271.8	62.8
40	39.0	9.0	100	97.4	22.5	60	155.9	36.0	20	214.4	49.5	80	272.8	63.0
41	39.9	9.2	101	98.4	22.7	161	156.9	36.2	221	215.3	49.7	281	273.8	63.2
42	40.9	9.4	02	99.4	22.9	62	157.8	36.4	22	216.3	49.9	82	274.8	63.4
43	41.9	9.7	03	100.4	23.2	63	158.8	36.7	23	217.3	50.2	83	275.7	63.7
44	42.9	9.9	04	101.3	23.4	64	159.8	36.9	24	218.3	50.4	84	276.7	63.9
45	43.8	10.1	05	102.3	23.6	65	160.8	37.1	25	219.2	50.6	85	277.7	64.1
46	44.8	10.3	06	103.3	23.8	66	161.7	37.3	26	220.2	50.8	86	278.7	64.3
47	45.8	10.6	07	104.3	24.1	67	162.7	37.6	27	221.2	51.1	87	279.6	64.6
48	46.8	10.8	08	105.2	24.3	68	163.7	37.8	28	222.2	51.3	88	280.6	64.8
49	47.7	11.0	09	106.2	24.5	69	164.7	38.0	29	223.1	51.5	89	281.6	65.0
50	48.7	11.2	10	107.2	24.7	70	165.6	38.2	30	224.1	51.7	90	282.6	65.2
51	49.7	11.5	111	108.2	25.0	171	166.6	38.5	231	225.1	52.0	291	283.5	65.5
52	50.7	11.7	12	109.1	25.2	72	167.6	38.7	32	226.1	52.2	92	284.5	65.7
53	51.6	11.9	13	110.1	25.4	73	168.6	38.9	33	227.0	52.4	93	285.5	65.9
54	52.6	12.1	14	111.1	25.6	74	169.5	39.1	34	228.0	52.6	94	286.5	66.1
55	53.6	12.4	15	112.1	25.9	75	170.5	39.4	35	229.0	52.9	95	287.4	66.4
56	54.6	12.6	16	113.0	26.1	76	171.5	39.6	36	230.0	53.1	96	288.4	66.6
57	55.5	12.8	17	114.0	26.3	77	172.5	39.8	37	230.9	53.3	97	289.4	66.8
58	56.5	13.0	18	115.0	26.5	78	173.4	40.0	38	231.9	53.5	98	290.4	67.0
59	57.5	13.3	19	116.0	26.8	79	174.4	40.3	39	232.9	53.8	99	291.3	67.3
60	58.5	13.5	20	116.9	27.0	80	175.4	40.5	40	233.8	54.0	300	292.3	67.5
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

77° (103°, 257°, 283°).

TABLE 2.

Difference of Latitude and Departure for 13° (167°, 193°, 347°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	293.3	67.7	361	351.8	81.2	421	410.2	94.7	481	468.7	108.2	541	527.2	121.7
02	294.3	67.9	62	352.7	81.4	22	411.2	94.9	82	469.7	108.4	42	528.1	121.9
03	295.2	68.1	63	353.7	81.6	23	412.2	95.1	83	470.6	108.6	43	529.1	122.1
04	296.2	68.4	64	354.7	81.9	24	413.1	95.3	84	471.6	108.8	44	530.1	122.3
05	297.2	68.6	65	355.6	82.1	25	414.1	95.6	85	472.6	109.0	45	531.1	122.5
06	298.2	68.8	66	356.6	82.3	26	415.1	95.8	86	473.6	109.3	46	532.0	122.8
07	299.1	69.0	67	357.6	82.5	27	416.1	96.0	87	474.5	109.5	47	533.0	123.0
08	300.1	69.3	68	358.6	82.8	28	417.0	96.2	88	475.5	109.7	48	534.0	123.2
09	301.1	69.5	69	359.5	83.0	29	418.0	96.5	89	476.5	109.9	49	535.0	123.4
10	302.1	69.7	70	360.5	83.2	30	419.0	96.7	90	477.5	110.1	50	535.9	123.7
311	303.0	69.9	371	361.5	83.4	431	420.0	96.9	491	478.4	110.4	551	536.9	123.9
12	304.0	70.2	72	362.5	83.7	32	420.9	97.1	92	479.4	110.6	52	537.9	124.1
13	305.0	70.4	73	363.4	83.9	33	421.9	97.4	93	480.4	110.9	53	538.9	124.4
14	306.0	70.6	74	364.4	84.1	34	422.9	97.6	94	481.4	111.1	54	539.8	124.6
15	306.9	70.8	75	365.4	84.3	35	423.9	97.8	95	482.3	111.3	55	540.8	124.9
16	307.9	71.1	76	366.4	84.6	36	424.8	98.0	96	483.3	111.5	56	541.8	125.1
17	308.9	71.3	77	367.3	84.8	37	425.8	98.3	97	484.3	111.8	57	542.8	125.3
18	309.9	71.5	78	368.3	85.0	38	426.8	98.5	98	485.3	112.0	58	543.7	125.5
19	310.8	71.7	79	369.3	85.2	39	427.8	98.7	99	486.2	112.2	59	544.7	125.8
20	311.8	72.0	80	370.3	85.5	40	428.7	98.9	500	487.2	112.4	60	545.7	126.0
321	312.8	72.2	381	371.2	85.7	441	429.7	99.2	501	488.2	112.6	561	546.7	126.2
22	313.8	72.4	82	372.2	85.9	42	430.7	99.4	02	489.2	112.9	62	547.6	126.4
23	314.7	72.6	83	373.2	86.1	43	431.6	99.6	03	490.1	113.1	63	548.6	126.7
24	315.7	72.9	84	374.2	86.4	44	432.6	99.8	04	491.1	113.3	64	549.6	126.9
25	316.7	73.1	85	375.1	86.6	45	433.6	100.1	05	492.1	113.5	65	550.6	127.1
26	317.6	73.3	86	376.1	86.8	46	434.6	100.3	06	493.1	113.8	66	551.5	127.3
27	318.6	73.5	87	377.1	87.0	47	435.5	100.5	07	494.0	114.0	67	552.5	127.6
28	319.6	73.8	88	378.1	87.3	48	436.5	100.7	08	495.0	114.2	68	553.5	127.8
29	320.6	74.0	89	379.0	87.5	49	437.5	101.0	09	496.0	114.5	69	554.5	128.0
30	321.5	74.2	90	380.0	87.7	50	438.5	101.2	10	496.9	114.7	70	555.4	128.3
331	322.5	74.4	391	381.0	87.9	451	439.4	101.4	511	497.9	114.9	571	556.4	128.5
32	323.5	74.7	92	382.0	88.2	52	440.4	101.6	12	498.9	115.1	72	557.4	128.7
33	324.5	74.9	93	382.9	88.4	53	441.4	101.9	13	499.9	115.4	73	558.4	128.9
34	325.4	75.1	94	383.9	88.6	54	442.4	102.1	14	500.8	115.6	74	559.3	129.2
35	326.4	75.3	95	384.9	88.8	55	443.3	102.3	15	501.8	115.8	75	560.3	129.4
36	327.4	75.6	96	385.9	89.1	56	444.3	102.5	16	502.8	116.0	76	561.3	129.6
37	328.4	75.8	97	386.8	89.3	57	445.3	102.8	17	503.8	116.3	77	562.3	129.8
38	329.3	76.0	98	387.8	89.5	58	446.3	103.0	18	504.7	116.5	78	563.2	130.0
39	330.3	76.2	99	388.8	89.7	59	447.2	103.2	19	505.7	116.7	79	564.2	130.2
40	331.3	76.5	400	389.8	90.0	60	448.2	103.4	20	506.7	116.9	80	565.2	130.4
341	332.3	76.7	401	390.7	90.2	461	449.2	103.7	521	507.7	117.2	581	566.2	130.7
42	333.2	76.9	02	391.7	90.4	62	450.2	103.9	22	508.6	117.5	82	567.1	131.0
43	334.2	77.1	03	392.7	90.6	63	451.1	104.1	23	509.6	117.7	83	568.1	131.2
44	335.2	77.4	04	393.6	90.8	64	452.1	104.3	24	510.6	117.9	84	569.1	131.4
45	336.2	77.6	05	394.6	91.1	65	453.1	104.6	25	511.6	118.1	85	570.1	131.6
46	337.1	77.8	06	395.6	91.3	66	454.1	104.8	26	512.5	118.3	86	571.0	131.8
47	338.1	78.0	07	396.6	91.5	67	455.0	105.0	27	513.5	118.5	87	572.0	132.0
48	339.1	78.3	08	397.5	91.7	68	456.0	105.2	28	514.5	118.7	88	573.0	132.3
49	340.1	78.5	09	398.5	92.0	69	457.0	105.5	29	515.5	119.0	89	573.9	132.5
50	341.0	78.7	10	399.5	92.2	70	458.0	105.7	30	516.4	119.2	90	574.9	132.8
351	342.0	78.9	411	400.5	92.4	471	458.9	105.9	531	517.4	119.4	591	575.9	133.0
52	343.0	79.2	12	401.4	92.6	72	459.9	106.1	32	518.4	119.6	92	576.9	133.2
53	344.0	79.4	13	402.4	92.9	73	460.9	106.4	33	519.4	119.9	93	577.8	133.4
54	344.9	79.6	14	403.4	93.1	74	461.9	106.6	34	520.3	120.1	94	578.8	133.6
55	345.9	79.8	15	404.4	93.3	75	462.8	106.8	35	521.3	120.3	95	579.8	133.8
56	346.9	80.1	16	405.3	93.5	76	463.8	107.0	36	522.3	120.5	96	580.8	134.0
57	347.9	80.3	17	406.3	93.8	77	464.8	107.3	37	523.3	120.8	97	581.7	134.3
58	348.8	80.5	18	407.3	94.0	78	465.8	107.5	38	524.2	121.0	98	582.7	134.5
59	349.8	80.7	19	408.3	94.2	79	466.7	107.7	39	525.2	121.2	99	583.7	134.8
60	350.8	81.0	20	409.2	94.4	80	467.7	107.9	40	526.2	121.5	600	584.6	135.0
Dist.	Dep.	Lat.	Dist	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

77° (103°, 257°, 283°).

TABLE 2.

Difference of Latitude and Departure for 14° (166°, 194°, 346°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.2	61	59.2	14.8	121	117.4	29.3	181	175.6	43.8	241	233.8	58.3
2	1.9	0.5	62	60.2	15.0	22	118.4	29.5	82	176.6	44.0	42	234.8	58.5
3	2.9	0.7	63	61.1	15.2	23	119.3	29.8	83	177.6	44.3	43	235.8	58.8
4	3.9	1.0	64	62.1	15.5	24	120.3	30.0	84	178.5	44.5	44	236.8	59.0
5	4.9	1.2	65	63.1	15.7	25	121.3	30.2	85	179.5	44.8	45	237.7	59.3
6	5.8	1.5	66	64.0	16.0	26	122.3	30.5	86	180.5	45.0	46	238.7	59.5
7	6.8	1.7	67	65.0	16.2	27	123.2	30.7	87	181.4	45.2	47	239.7	59.8
8	7.8	1.9	68	66.0	16.5	28	124.2	31.0	88	182.4	45.5	48	240.6	60.0
9	8.7	2.2	69	67.0	16.7	29	125.2	31.2	89	183.4	45.7	49	241.6	60.2
10	9.7	2.4	70	67.9	16.9	30	126.1	31.4	90	184.4	46.0	50	242.6	60.5
11	10.7	2.7	71	68.9	17.2	131	127.1	31.7	191	185.3	46.2	251	243.5	60.7
12	11.6	2.9	72	69.9	17.4	32	128.1	31.9	92	186.3	46.4	52	244.5	61.0
13	12.6	3.1	73	70.8	17.7	33	129.0	32.2	93	187.3	46.7	53	245.5	61.2
14	13.6	3.4	74	71.8	17.9	34	130.0	32.4	94	188.2	46.9	54	246.5	61.4
15	14.6	3.6	75	72.8	18.1	35	131.0	32.7	95	189.2	47.2	55	247.4	61.7
16	15.5	3.9	76	73.7	18.4	36	132.0	32.9	96	190.2	47.4	56	248.4	61.9
17	16.5	4.1	77	74.7	18.6	37	132.9	33.1	97	191.1	47.7	57	249.4	62.2
18	17.5	4.4	78	75.7	18.9	38	133.9	33.4	98	192.1	47.9	58	250.3	62.4
19	18.4	4.6	79	76.7	19.1	39	134.9	33.6	99	193.1	48.1	59	251.3	62.7
20	19.4	4.8	80	77.6	19.4	40	135.8	33.9	200	194.1	48.4	60	252.3	62.9
21	20.4	5.1	81	78.6	19.6	141	136.8	34.1	201	195.0	48.6	261	253.2	63.1
22	21.3	5.3	82	79.6	19.8	42	137.8	34.4	02	196.0	48.9	62	254.2	63.4
23	22.3	5.6	83	80.5	20.1	43	138.8	34.6	03	197.0	49.1	63	255.2	63.6
24	23.3	5.8	84	81.5	20.3	44	139.7	34.8	04	197.9	49.4	64	256.2	63.9
25	24.3	6.0	85	82.5	20.6	45	140.7	35.1	05	198.9	49.6	65	257.1	64.1
26	25.2	6.3	86	83.4	20.8	46	141.7	35.3	06	199.9	49.8	66	258.1	64.4
27	26.2	6.5	87	84.4	21.0	47	142.6	35.6	07	200.9	50.1	67	259.1	64.6
28	27.2	6.8	88	85.4	21.3	48	143.6	35.8	08	201.8	50.3	68	260.0	64.8
29	28.1	7.0	89	86.4	21.5	49	144.6	36.0	09	202.8	50.6	69	261.0	65.1
30	29.1	7.3	90	87.3	21.8	50	145.5	36.3	10	203.8	50.8	70	262.0	65.3
31	30.1	7.5	91	88.3	22.0	151	146.5	36.5	211	204.7	51.0	271	263.0	65.6
32	31.0	7.7	92	89.3	22.3	52	147.5	36.8	12	205.7	51.3	72	263.9	65.8
33	32.0	8.0	93	90.2	22.5	53	148.5	37.0	13	206.7	51.5	73	264.9	66.0
34	33.0	8.2	94	91.2	22.7	54	149.4	37.3	14	207.6	51.8	74	265.9	66.3
35	34.0	8.5	95	92.2	23.0	55	150.4	37.5	15	208.6	52.0	75	266.8	66.5
36	34.9	8.7	96	93.1	23.2	56	151.4	37.7	16	209.6	52.3	76	267.8	66.8
37	35.9	9.0	97	94.1	23.5	57	152.3	38.0	17	210.6	52.5	77	268.8	67.0
38	36.9	9.2	98	95.1	23.7	58	153.3	38.2	18	211.5	52.7	78	269.7	67.3
39	37.8	9.4	99	96.1	24.0	59	154.3	38.5	19	212.5	53.0	79	270.7	67.5
40	38.8	9.7	100	97.0	24.2	60	155.2	38.7	20	213.5	53.2	80	271.7	67.7
41	39.8	9.9	101	98.0	24.4	161	156.2	38.9	221	214.4	53.5	281	272.7	68.0
42	40.8	10.2	02	99.0	24.7	62	157.2	39.2	22	215.4	53.7	82	273.6	68.2
43	41.7	10.4	03	99.9	24.9	63	158.2	39.4	23	216.4	53.9	83	274.6	68.5
44	42.7	10.6	04	100.9	25.2	64	159.1	39.7	24	217.3	54.2	84	275.6	68.7
45	43.7	10.9	05	101.9	25.4	65	160.1	39.9	25	218.3	54.4	85	276.5	68.9
46	44.6	11.1	06	102.9	25.6	66	161.1	40.2	26	219.3	54.7	86	277.5	69.2
47	45.6	11.4	07	103.8	25.9	67	162.0	40.4	27	220.3	54.9	87	278.5	69.4
48	46.6	11.6	08	104.8	26.1	68	163.0	40.6	28	221.2	55.2	88	279.4	69.7
49	47.5	11.9	09	105.8	26.4	69	164.0	40.9	29	222.2	55.4	89	280.4	69.9
50	48.5	12.1	10	106.7	26.6	70	165.0	41.1	30	223.2	55.6	90	281.4	70.2
51	49.5	12.3	111	107.7	26.9	171	165.9	41.4	231	224.1	55.9	291	282.4	70.4
52	50.5	12.6	12	108.7	27.1	72	166.9	41.6	32	225.1	56.1	92	283.3	70.6
53	51.4	12.8	13	109.6	27.3	73	167.9	41.9	33	226.1	56.4	93	284.3	70.9
54	52.4	13.1	14	110.6	27.6	74	168.8	42.1	34	227.0	56.6	94	285.3	71.1
55	53.4	13.3	15	111.6	27.8	75	169.8	42.3	35	228.0	56.9	95	286.2	71.4
56	54.3	13.5	16	112.6	28.1	76	170.8	42.6	36	229.0	57.1	96	287.2	71.6
57	55.3	13.8	17	113.5	28.3	77	171.7	42.8	37	230.0	57.3	97	288.2	71.9
58	56.3	14.0	18	114.5	28.5	78	172.7	43.1	38	230.9	57.6	98	289.1	72.1
59	57.2	14.3	19	115.5	28.8	79	173.7	43.3	39	231.9	57.8	99	290.1	72.3
60	58.2	14.5	20	116.4	29.0	80	174.7	43.5	40	232.9	58.1	300	291.1	72.6
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

76° (104°, 256°, 284°).

TABLE 2.

Difference of Latitude and Departure for 14° (166°, 194°, 346°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	292.0	72.8	361	350.2	87.3	421	408.5	101.8	481	466.7	116.3	541	525.0	130.9
02	293.0	73.0	62	351.2	87.6	22	409.4	102.1	82	467.7	116.6	42	525.9	131.2
03	294.0	73.3	63	352.2	87.8	23	410.4	102.3	83	468.6	116.8	43	526.9	131.4
04	294.9	73.5	64	353.2	88.0	24	411.4	102.6	84	469.6	117.1	44	527.9	131.6
05	295.9	73.8	65	354.1	88.3	25	412.3	102.8	85	470.6	117.3	45	528.8	131.9
06	296.9	74.0	66	355.1	88.5	26	413.3	103.0	86	471.5	117.6	46	529.8	132.1
07	297.8	74.2	67	356.1	88.8	27	414.3	103.3	87	472.5	117.8	47	530.8	132.3
08	298.8	74.5	68	357.0	89.0	28	415.3	103.5	88	473.5	118.0	48	531.7	132.6
09	299.8	74.7	69	358.0	89.2	29	416.2	103.8	89	474.5	118.3	49	532.7	132.8
10	300.8	75.0	70	359.0	89.5	30	417.2	104.0	90	475.4	118.5	50	533.7	133.0
311	301.7	75.2	371	359.9	89.7	431	418.2	104.2	491	476.4	118.8	551	534.6	133.3
12	302.7	75.5	72	360.9	90.0	32	419.1	104.5	92	477.4	119.0	52	535.6	133.6
13	303.7	75.7	73	361.9	90.2	33	420.1	104.7	93	478.3	119.2	53	536.6	133.8
14	304.6	75.9	74	362.9	90.5	34	421.1	105.0	94	479.3	119.5	54	537.5	134.0
15	305.6	76.2	75	363.8	90.7	35	422.0	105.2	95	480.3	119.7	55	538.5	134.3
16	306.6	76.4	76	364.8	90.9	36	423.0	105.5	96	481.3	120.0	56	539.5	134.5
17	307.6	76.7	77	365.8	91.2	37	424.0	105.7	97	482.2	120.2	57	540.5	134.8
18	308.5	76.9	78	366.7	91.4	38	425.0	105.9	98	483.2	120.4	58	541.4	135.0
19	309.5	77.2	79	367.7	91.7	39	425.9	106.2	99	484.2	120.7	59	542.4	135.2
20	310.5	77.4	80	368.7	91.9	40	426.9	106.4	500	485.1	121.0	60	543.4	135.5
321	311.4	77.6	381	369.6	92.2	441	427.9	106.7	501	486.1	121.2	561	544.3	135.7
22	312.4	77.9	82	370.6	92.4	42	428.8	106.9	02	487.1	121.4	62	545.3	135.9
23	313.4	78.1	83	371.6	92.6	43	429.8	107.1	03	488.0	121.7	63	546.3	136.2
24	314.3	78.4	84	372.6	92.9	44	430.8	107.4	04	489.0	122.0	64	547.2	136.5
25	315.3	78.6	85	373.5	93.1	45	431.7	107.6	05	490.0	122.1	65	548.2	136.6
26	316.3	78.8	86	374.5	93.4	46	432.7	107.9	06	491.0	122.4	66	549.2	136.9
27	317.3	79.1	87	375.5	93.6	47	433.7	108.1	07	491.9	122.6	67	550.1	137.1
28	318.2	79.3	88	376.4	93.8	48	434.7	108.4	08	492.9	122.9	68	551.1	137.4
29	319.2	79.6	89	377.4	94.1	49	435.6	108.6	09	493.9	123.1	69	552.1	137.6
30	320.2	79.8	90	378.4	94.3	50	436.6	108.8	10	494.9	123.4	70	553.1	137.9
331	321.1	80.1	391	379.4	94.6	451	437.6	109.1	511	495.8	123.6	571	554.0	138.1
32	322.1	80.3	92	380.3	94.8	52	438.5	109.3	12	496.8	123.8	72	555.0	138.3
33	323.1	80.5	93	381.3	95.1	53	439.5	109.6	13	497.8	124.1	73	556.0	138.6
34	324.0	80.8	94	382.3	95.3	54	440.5	109.8	14	498.7	124.3	74	557.0	138.8
35	325.0	81.0	95	383.2	95.5	55	441.5	110.1	15	499.7	124.6	75	557.9	139.1
36	326.0	81.3	96	384.2	95.8	56	442.4	110.3	16	500.7	124.8	76	558.9	139.3
37	327.0	81.5	97	385.2	96.0	57	443.4	110.5	17	501.7	125.0	77	559.9	139.5
38	327.9	81.7	98	386.1	96.3	58	444.4	110.8	18	502.6	125.3	78	560.9	139.8
39	328.9	82.0	99	387.1	96.5	59	445.3	111.0	19	503.6	125.6	79	561.8	140.0
40	329.9	82.2	400	388.1	96.7	60	446.3	111.3	20	504.6	125.8	80	562.8	140.3
341	330.8	82.5	401	389.1	97.0	461	447.3	111.5	521	505.5	126.0	581	563.8	140.5
42	331.8	82.7	02	390.0	97.2	62	448.2	111.7	22	506.5	126.2	82	564.7	140.8
43	332.8	83.0	03	391.0	97.5	63	449.2	112.0	23	507.5	126.5	83	565.7	141.0
44	333.7	83.2	04	392.0	97.7	64	450.2	112.2	24	508.4	126.8	84	566.7	141.3
45	334.7	83.4	05	392.9	98.0	65	451.2	112.5	25	509.4	127.0	85	567.6	141.5
46	335.7	83.7	06	393.9	98.2	66	452.1	112.7	26	510.4	127.2	86	568.6	141.8
47	336.7	83.9	07	394.9	98.4	67	453.1	113.0	27	511.4	127.5	87	569.6	142.0
48	337.6	84.2	08	395.8	98.7	68	454.1	113.2	28	512.3	127.8	88	570.6	142.3
49	338.6	84.4	09	396.8	98.9	69	455.0	113.4	29	513.3	128.0	89	571.5	142.5
50	339.6	84.7	10	397.8	99.2	70	456.0	113.7	30	514.3	128.2	90	572.5	142.8
351	340.5	84.9	411	398.8	99.4	471	457.0	113.9	531	515.3	128.5	591	573.5	143.0
52	341.5	85.1	12	399.7	99.7	72	457.9	114.2	32	516.2	128.8	92	574.4	143.3
53	342.5	85.4	13	400.7	99.9	73	458.9	114.4	33	517.2	129.0	93	575.4	143.5
54	343.5	85.6	14	401.7	100.1	74	459.9	114.6	34	518.2	129.2	94	576.4	143.8
55	344.4	85.9	15	402.6	100.4	75	460.9	114.9	35	519.1	129.4	95	577.3	144.0
56	345.4	86.1	16	403.6	100.6	76	461.8	115.1	36	520.1	129.7	96	578.3	144.2
57	346.4	86.3	17	404.6	100.9	77	462.8	115.4	37	521.1	129.9	97	579.3	144.5
58	347.3	86.6	18	405.5	101.1	78	463.8	115.6	38	522.1	130.2	98	580.3	144.7
59	348.3	86.8	19	406.5	101.3	79	464.7	115.9	39	523.0	130.4	99	581.2	144.9
60	349.3	87.1	20	407.5	101.6	80	465.7	116.1	40	524.0	130.6	600	582.2	145.1
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

76° (104°, 256°, 284°).

TABLE 2.

Difference of Latitude and Departure for 15° (165°, 195°, 345°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.3	61	58.9	15.8	121	116.9	31.3	181	174.8	46.8	241	232.8	62.4
2	1.9	0.5	62	59.9	16.0	22	117.8	31.6	82	175.8	47.1	42	233.8	62.6
3	2.9	0.8	63	60.9	16.3	23	118.8	31.8	83	176.8	47.4	43	234.7	62.9
4	3.9	1.0	64	61.8	16.6	24	119.8	32.1	84	177.7	47.6	44	235.7	63.2
5	4.8	1.3	65	62.8	16.8	25	120.7	32.4	85	178.7	47.9	45	236.7	63.4
6	5.8	1.6	66	63.8	17.1	26	121.7	32.6	86	179.7	48.1	46	237.6	63.7
7	6.8	1.8	67	64.7	17.3	27	122.7	32.9	87	180.6	48.4	47	238.6	63.9
8	7.7	2.1	68	65.7	17.6	28	123.6	33.1	88	181.6	48.7	48	239.5	64.2
9	8.7	2.3	69	66.6	17.9	29	124.6	33.4	89	182.6	48.9	49	240.5	64.4
10	9.7	2.6	70	67.6	18.1	30	125.6	33.6	90	183.5	49.2	50	241.5	64.7
11	10.6	2.8	71	68.6	18.4	131	126.5	33.9	191	184.5	49.4	251	242.4	65.0
12	11.6	3.1	72	69.5	18.6	32	127.5	34.2	92	185.5	49.7	52	243.4	65.2
13	12.6	3.4	73	70.5	18.9	33	128.5	34.4	93	186.4	50.0	53	244.4	65.5
14	13.5	3.6	74	71.5	19.2	34	129.4	34.7	94	187.4	50.2	54	245.3	65.7
15	14.5	3.9	75	72.4	19.4	35	130.4	34.9	95	188.4	50.5	55	246.3	66.0
16	15.5	4.1	76	73.4	19.7	36	131.4	35.2	96	189.3	50.7	56	247.3	66.3
17	16.4	4.4	77	74.4	19.9	37	132.3	35.5	97	190.3	51.0	57	248.2	66.5
18	17.4	4.7	78	75.3	20.2	38	133.3	35.7	98	191.3	51.2	58	249.2	66.8
19	18.4	4.9	79	76.3	20.4	39	134.3	36.0	99	192.2	51.5	59	250.2	67.0
20	19.3	5.2	80	77.3	20.7	40	135.2	36.2	200	193.2	51.8	60	251.1	67.3
21	20.3	5.4	81	78.2	21.0	141	136.2	36.5	201	194.2	52.0	261	252.1	67.6
22	21.3	5.7	82	79.2	21.2	42	137.2	36.8	02	195.1	52.3	62	253.1	67.8
23	22.2	6.0	83	80.2	21.5	43	138.1	37.0	03	196.1	52.5	63	254.0	68.1
24	23.2	6.2	84	81.1	21.7	44	139.1	37.3	04	197.0	52.8	64	255.0	68.3
25	24.1	6.5	85	82.1	22.0	45	140.1	37.5	05	198.0	53.1	65	256.0	68.6
26	25.1	6.7	86	83.1	22.3	46	141.0	37.8	06	199.0	53.3	66	256.9	68.8
27	26.1	7.0	87	84.0	22.5	47	142.0	38.0	07	199.9	53.6	67	257.9	69.1
28	27.0	7.2	88	85.0	22.8	48	143.0	38.3	08	200.9	53.8	68	258.9	69.4
29	28.0	7.5	89	86.0	23.0	49	143.9	38.6	09	201.9	54.1	69	259.8	69.6
30	29.0	7.8	90	86.9	23.3	50	144.9	38.8	10	202.8	54.4	70	260.8	69.9
31	29.9	8.0	91	87.9	23.6	151	145.9	39.1	211	203.8	54.6	271	261.8	70.1
32	30.9	8.3	92	88.9	23.8	52	146.8	39.3	12	204.8	54.9	72	262.7	70.4
33	31.9	8.5	93	89.8	24.1	53	147.8	39.6	13	205.7	55.1	73	263.7	70.7
34	32.8	8.8	94	90.8	24.3	54	148.8	39.9	14	206.7	55.4	74	264.7	70.9
35	33.8	9.1	95	91.8	24.6	55	149.7	40.1	15	207.7	55.6	75	265.6	71.2
36	34.8	9.3	96	92.7	24.8	56	150.7	40.4	16	208.6	55.9	76	266.6	71.4
37	35.7	9.6	97	93.7	25.1	57	151.7	40.6	17	209.6	56.2	77	267.6	71.7
38	36.7	9.8	98	94.7	25.4	58	152.6	40.9	18	210.6	56.4	78	268.5	72.0
39	37.7	10.1	99	95.6	25.6	59	153.6	41.2	19	211.5	56.7	79	269.5	72.2
40	38.6	10.4	100	96.6	25.9	60	154.5	41.4	20	212.5	56.9	80	270.5	72.5
41	39.6	10.6	101	97.6	26.1	161	155.5	41.7	221	213.5	57.2	281	271.4	72.7
42	40.6	10.9	02	98.5	26.4	62	156.5	41.9	22	214.4	57.5	82	272.4	73.0
43	41.5	11.1	03	99.5	26.7	63	157.4	42.2	23	215.4	57.7	83	273.4	73.2
44	42.5	11.4	04	100.5	26.9	64	158.4	42.4	24	216.4	58.0	84	274.3	73.5
45	43.5	11.6	05	101.4	27.2	65	159.4	42.7	25	217.3	58.2	85	275.3	73.8
46	44.4	11.9	06	102.4	27.4	66	160.3	43.0	26	218.3	58.5	86	276.3	74.0
47	45.4	12.2	07	103.4	27.7	67	161.3	43.2	27	219.3	58.8	87	277.2	74.3
48	46.4	12.4	08	104.3	28.0	68	162.3	43.5	28	220.2	59.0	88	278.2	74.5
49	47.3	12.7	09	105.3	28.2	69	163.2	43.7	29	221.2	59.3	89	279.2	74.8
50	48.3	12.9	10	106.3	28.5	70	164.2	44.0	30	222.2	59.5	90	280.1	75.1
51	49.3	13.2	111	107.2	28.7	171	165.2	44.3	231	223.1	59.8	291	281.1	75.3
52	50.2	13.5	12	108.2	29.0	72	166.1	44.5	32	224.1	60.0	92	282.1	75.6
53	51.2	13.7	13	109.1	29.2	73	167.1	44.8	33	225.1	60.3	93	283.0	75.8
54	52.2	14.0	14	110.1	29.5	74	168.1	45.0	34	226.0	60.6	94	284.0	76.1
55	53.1	14.2	15	111.1	29.8	75	169.0	45.3	35	227.0	60.8	95	284.9	76.4
56	54.1	14.5	16	112.0	30.0	76	170.0	45.6	36	228.0	61.1	96	285.9	76.6
57	55.1	14.8	17	113.0	30.3	77	171.0	45.8	37	228.9	61.3	97	286.9	76.9
58	56.0	15.0	18	114.0	30.5	78	171.9	46.1	38	229.9	61.6	98	287.8	77.1
59	57.0	15.3	19	114.9	30.8	79	172.9	46.3	39	230.9	61.9	99	288.8	77.4
60	58.0	15.5	20	115.9	31.1	80	173.9	46.6	40	231.8	62.1	300	289.8	77.6
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

75° (105°, 255°, 285°).

TABLE 2.

Difference of Latitude and Departure for 15° (165°, 195°, 345°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	290.7	77.9	361	348.7	93.4	421	406.6	109.0	481	464.6	124.5	541	522.6	140.0
02	291.7	78.2	62	349.6	93.7	22	407.6	109.2	82	465.6	124.8	42	523.5	140.3
03	292.7	78.4	63	350.6	94.0	23	408.6	109.5	83	466.5	125.0	43	524.5	140.5
04	293.6	78.7	64	351.6	94.2	24	409.5	109.7	84	467.5	125.3	44	525.5	140.8
05	294.6	78.9	65	352.5	94.5	25	410.5	110.0	85	468.5	125.6	45	526.4	141.1
06	295.6	79.2	66	353.5	94.7	26	411.5	110.3	86	469.4	125.8	46	527.4	141.4
07	296.5	79.5	67	354.5	95.0	27	412.4	110.5	87	470.4	126.1	47	528.4	141.6
08	297.5	79.7	68	355.4	95.3	28	413.4	110.8	88	471.4	126.4	48	529.3	141.9
09	298.4	80.0	69	356.4	95.5	29	414.4	111.0	89	472.3	126.6	49	530.3	142.1
10	299.4	80.2	70	357.4	95.8	30	415.3	111.3	90	473.3	126.9	50	531.3	142.4
311	300.4	80.5	371	358.3	96.0	431	416.3	111.6	491	474.3	127.1	551	532.2	142.6
12	301.3	80.8	72	359.3	96.3	32	417.3	111.8	92	475.2	127.4	52	533.2	142.9
13	302.3	81.0	73	360.3	96.5	33	418.2	112.1	93	476.2	127.6	53	534.2	143.1
14	303.3	81.3	74	361.2	96.8	34	419.2	112.3	94	477.2	127.9	54	535.1	143.4
15	304.2	81.5	75	362.2	97.1	35	420.2	112.6	95	478.1	128.1	55	536.1	143.7
16	305.2	81.8	76	363.2	97.3	36	421.1	112.9	96	479.1	128.4	56	537.1	143.9
17	306.2	82.1	77	364.1	97.6	37	422.1	113.1	97	480.1	128.6	57	538.0	144.2
18	307.1	82.3	78	365.1	97.8	38	423.1	113.4	98	481.0	128.9	58	539.0	144.4
19	308.1	82.6	79	366.1	98.1	39	424.0	113.6	99	482.0	129.1	59	540.0	144.7
20	309.1	82.8	80	367.0	98.4	40	425.0	113.9	500	483.0	129.4	60	540.9	144.9
321	310.0	83.1	381	368.0	98.6	441	426.0	114.1	501	483.9	129.7	561	541.9	145.2
22	311.0	83.3	82	369.0	98.9	42	426.9	114.4	02	484.9	129.9	62	542.9	145.4
23	312.0	83.6	83	369.9	99.1	43	427.9	114.7	03	485.9	130.2	63	543.8	145.7
24	312.9	83.9	84	370.9	99.4	44	428.8	114.9	04	486.8	130.4	64	544.8	146.0
25	313.9	84.1	85	371.9	99.6	45	429.8	115.2	05	487.8	130.7	65	545.8	146.2
26	314.9	84.4	86	372.8	99.9	46	430.8	115.4	06	488.8	131.0	66	546.7	146.5
27	315.8	84.6	87	373.8	100.2	47	431.7	115.7	07	489.7	131.2	67	547.7	146.7
28	316.8	84.9	88	374.8	100.4	48	432.7	116.0	08	490.7	131.5	68	548.7	147.0
29	317.8	85.1	89	375.7	100.7	49	433.7	116.2	09	491.7	131.7	69	549.6	147.2
30	318.7	85.4	90	376.7	100.9	50	434.6	116.5	10	492.6	132.0	70	550.6	147.5
331	319.7	85.7	391	377.7	101.2	451	435.6	116.7	511	493.6	132.3	571	551.6	147.8
32	320.7	85.9	92	378.6	101.5	52	436.6	117.0	12	494.5	132.5	72	552.5	148.0
33	321.6	86.2	93	379.6	101.7	53	437.5	117.3	13	495.5	132.8	73	553.5	148.3
34	322.6	86.5	94	380.6	102.0	54	438.5	117.5	14	496.5	133.0	74	554.4	148.5
35	323.6	86.7	95	381.5	102.2	55	439.5	117.8	15	497.4	133.3	75	555.4	148.8
36	324.5	87.0	96	382.5	102.5	56	440.4	118.0	16	498.4	133.5	76	556.4	149.0
37	325.5	87.2	97	383.4	102.8	57	441.4	118.3	17	499.4	133.8	77	557.3	149.3
38	326.5	87.5	98	384.4	103.0	58	442.4	118.5	18	500.3	134.0	78	558.3	149.5
39	327.4	87.7	99	385.4	103.3	59	443.3	118.8	19	501.3	134.3	79	559.3	149.8
40	328.4	88.0	400	386.3	103.5	60	444.3	119.1	20	502.3	134.6	80	560.2	150.1
341	329.4	88.3	401	387.3	103.8	461	445.3	119.3	521	503.2	134.8	581	561.2	150.3
42	330.3	88.5	02	388.3	104.1	62	446.2	119.6	22	504.2	135.1	82	562.2	150.6
43	331.3	88.8	03	389.2	104.3	63	447.2	119.8	23	505.2	135.3	83	563.1	150.8
44	332.3	89.0	04	390.2	104.6	64	448.2	120.1	24	506.1	135.6	84	564.1	151.1
45	333.2	89.3	05	391.2	104.8	65	449.1	120.4	25	507.1	135.9	85	565.1	151.4
46	334.2	89.6	06	392.1	105.1	66	450.1	120.6	26	508.1	136.1	86	566.0	151.6
47	335.2	89.8	07	393.1	105.3	67	451.1	120.9	27	509.0	136.4	87	567.0	151.9
48	336.1	90.1	08	394.1	105.6	68	452.0	121.1	28	510.0	136.6	88	568.0	152.2
49	337.1	90.3	09	395.0	105.9	69	453.0	121.4	29	511.0	136.9	89	568.9	152.4
50	338.1	90.6	10	396.0	106.1	70	454.0	121.7	30	511.9	137.2	90	569.9	152.7
351	339.0	90.9	411	397.0	106.4	471	454.9	121.9	531	512.9	137.4	591	570.9	153.0
52	340.0	91.1	12	397.9	106.6	72	455.9	122.2	32	513.9	137.7	92	571.8	153.2
53	340.9	91.4	13	398.9	106.9	73	456.9	122.4	33	514.8	137.9	93	572.8	153.5
54	341.9	91.6	14	399.9	107.2	74	457.8	122.7	34	515.8	138.2	94	573.8	153.7
55	342.9	91.9	15	400.8	107.4	75	458.8	122.9	35	516.8	138.4	95	574.7	154.0
56	343.8	92.1	16	401.8	107.7	76	459.8	123.2	36	517.7	138.7	96	575.7	154.2
57	344.8	92.4	17	402.8	107.9	77	460.7	123.5	37	518.7	139.0	97	576.7	154.5
58	345.8	92.7	18	403.7	108.2	78	461.7	123.7	38	519.7	139.2	98	577.6	154.8
59	346.7	92.9	19	404.7	108.5	79	462.7	124.0	39	520.6	139.5	99	578.6	155.0
60	347.7	93.2	20	405.7	108.7	80	463.6	124.2	40	521.6	139.7	600	579.5	155.3
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

75° (105°, 255°, 285°).

TABLE 2.

Difference of Latitude and Departure for 16° (164°, 196°, 344°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.3	61	58.6	16.8	121	116.3	33.4	181	174.0	49.9	241	231.7	66.4
2	1.9	0.6	62	59.6	17.1	22	117.3	33.6	82	174.9	50.2	42	232.6	66.7
3	2.9	0.8	63	60.6	17.4	23	118.2	33.9	83	175.9	50.4	43	233.6	67.0
4	3.8	1.1	64	61.5	17.6	24	119.2	34.2	84	176.9	50.7	44	234.5	67.3
5	4.8	1.4	65	62.5	17.9	25	120.2	34.5	85	177.8	51.0	45	235.5	67.5
6	5.8	1.7	66	63.4	18.2	26	121.1	34.7	86	178.8	51.3	46	236.5	67.8
7	6.7	1.9	67	64.4	18.5	27	122.1	35.0	87	179.8	51.5	47	237.4	68.1
8	7.7	2.2	68	65.4	18.7	28	123.0	35.3	88	180.7	51.8	48	238.4	68.4
9	8.7	2.5	69	66.3	19.0	29	124.0	35.6	89	181.7	52.1	49	239.4	68.6
10	9.6	2.8	70	67.3	19.3	30	125.0	35.8	90	182.6	52.4	50	240.3	68.9
11	10.6	3.0	71	68.2	19.6	131	125.9	36.1	191	183.6	52.6	251	241.3	69.2
12	11.5	3.3	72	69.2	19.8	32	126.9	36.4	92	184.6	52.9	52	242.2	69.5
13	12.5	3.6	73	70.2	20.1	33	127.8	36.7	93	185.5	53.2	53	243.2	69.7
14	13.5	3.9	74	71.1	20.4	34	128.8	36.9	94	186.5	53.5	54	244.2	70.0
15	14.4	4.1	75	72.1	20.7	35	129.8	37.2	95	187.4	53.7	55	245.1	70.3
16	15.4	4.4	76	73.1	20.9	36	130.7	37.5	96	188.4	54.0	56	246.1	70.6
17	16.3	4.7	77	74.0	21.2	37	131.7	37.8	97	189.4	54.3	57	247.0	70.8
18	17.3	5.0	78	75.0	21.5	38	132.7	38.0	98	190.3	54.6	58	248.0	71.1
19	18.3	5.2	79	75.9	21.8	39	133.6	38.3	99	191.3	54.9	59	249.0	71.4
20	19.2	5.5	80	76.9	22.1	40	134.6	38.6	200	192.3	55.1	60	249.9	71.7
21	20.2	5.8	81	77.9	22.3	141	135.5	38.9	201	193.2	55.4	261	250.9	71.9
22	21.1	6.1	82	78.8	22.6	42	136.5	39.1	02	194.2	55.7	62	251.9	72.2
23	22.1	6.3	83	79.8	22.9	43	137.5	39.4	03	195.1	56.0	63	252.8	72.5
24	23.1	6.6	84	80.7	23.2	44	138.4	39.7	04	196.1	56.2	64	253.8	72.8
25	24.0	6.9	85	81.7	23.4	45	139.4	40.0	05	197.1	56.5	65	254.7	73.0
26	25.0	7.2	86	82.7	23.7	46	140.3	40.2	06	198.0	56.8	66	255.7	73.3
27	26.0	7.4	87	83.6	24.0	47	141.3	40.5	07	199.0	57.1	67	256.7	73.6
28	26.9	7.7	88	84.6	24.3	48	142.3	40.8	08	199.9	57.3	68	257.6	73.9
29	27.9	8.0	89	85.6	24.5	49	143.2	41.1	09	200.9	57.6	69	258.6	74.1
30	28.8	8.3	90	86.5	24.8	50	144.2	41.3	10	201.9	57.9	70	259.5	74.4
31	29.8	8.5	91	87.5	25.1	151	145.2	41.6	211	202.8	58.2	271	260.5	74.7
32	30.8	8.8	92	88.4	25.4	52	146.1	41.9	12	203.8	58.4	72	261.5	75.0
33	31.7	9.1	93	89.4	25.6	53	147.1	42.2	13	204.7	58.7	73	262.4	75.2
34	32.7	9.4	94	90.4	25.9	54	148.0	42.4	14	205.7	59.0	74	263.4	75.5
35	33.6	9.6	95	91.3	26.2	55	149.0	42.7	15	206.7	59.3	75	264.3	75.8
36	34.6	9.9	96	92.3	26.5	56	150.0	43.0	16	207.6	59.5	76	265.3	76.1
37	35.6	10.2	97	93.2	26.7	57	150.9	43.3	17	208.6	59.8	77	266.3	76.4
38	36.5	10.5	98	94.2	27.0	58	151.9	43.6	18	209.6	60.1	78	267.2	76.6
39	37.5	10.7	99	95.2	27.3	59	152.8	43.8	19	210.5	60.4	79	268.2	76.9
40	38.5	11.0	100	96.1	27.6	60	153.8	44.1	20	211.5	60.6	80	269.2	77.2
41	39.4	11.3	101	97.1	27.8	161	154.8	44.4	221	212.4	60.9	281	270.1	77.5
42	40.4	11.6	02	98.0	28.1	62	155.7	44.7	22	213.4	61.2	82	271.1	77.7
43	41.3	11.9	03	99.0	28.4	63	156.7	44.9	23	214.4	61.5	83	272.0	78.0
44	42.3	12.1	04	100.0	28.7	64	157.6	45.2	24	215.3	61.7	84	273.0	78.3
45	43.3	12.4	05	100.9	28.9	65	158.6	45.5	25	216.3	62.0	85	274.0	78.6
46	44.2	12.7	06	101.9	29.2	66	159.6	45.8	26	217.2	62.3	86	274.9	78.8
47	45.2	13.0	07	102.9	29.5	67	160.5	46.0	27	218.2	62.6	87	275.9	79.1
48	46.1	13.2	08	103.8	29.8	68	161.5	46.3	28	219.2	62.8	88	276.8	79.4
49	47.1	13.5	09	104.8	30.0	69	162.5	46.6	29	220.1	63.1	89	277.8	79.7
50	48.1	13.8	10	105.7	30.3	70	163.4	46.9	30	221.1	63.4	90	278.8	79.9
51	49.0	14.1	111	106.7	30.6	171	164.4	47.1	231	222.1	63.7	291	279.7	80.2
52	50.0	14.3	12	107.7	30.9	72	165.3	47.4	32	223.0	63.9	92	280.7	80.5
53	50.9	14.6	13	108.6	31.1	73	166.3	47.7	33	224.0	64.2	93	281.6	80.8
54	51.9	14.9	14	109.6	31.4	74	167.3	48.0	34	224.9	64.5	94	282.6	81.0
55	52.9	15.2	15	110.5	31.7	75	168.2	48.2	35	225.9	64.8	95	283.6	81.3
56	53.8	15.4	16	111.5	32.0	76	169.2	48.5	36	226.9	65.1	96	284.5	81.6
57	54.8	15.7	17	112.5	32.2	77	170.1	48.8	37	227.8	65.3	97	285.5	81.9
58	55.8	16.0	18	113.4	32.5	78	171.1	49.1	38	228.8	65.6	98	286.5	82.1
59	56.7	16.3	19	114.4	32.8	79	172.1	49.3	39	229.7	65.9	99	287.4	82.4
60	57.7	16.5	20	115.4	33.1	80	173.0	49.6	40	230.7	66.2	300	288.4	82.7
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

74° (106°, 254°, 286°).

TABLE 2.

Difference of Latitude and Departure for 16° (164°, 196°, 344°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	289.3	82.9	361	347.0	99.5	421	404.7	116.0	481	462.4	132.5	541	520.1	149.1
02	290.3	83.2	62	348.0	99.7	22	405.6	116.3	82	463.3	132.8	42	521.0	149.4
03	291.2	83.5	63	348.9	100.0	23	406.6	116.6	83	464.3	133.1	43	522.0	149.7
04	292.2	83.8	64	349.9	100.3	24	407.6	116.8	84	465.2	133.4	44	523.0	150.0
05	293.2	84.0	65	350.8	100.6	25	408.5	117.1	85	466.2	133.6	45	523.9	150.2
06	294.1	84.3	66	351.8	100.8	26	409.5	117.4	86	467.2	133.9	46	524.9	150.4
07	295.1	84.6	67	352.8	101.1	27	410.4	117.7	87	468.1	134.2	47	525.9	150.7
08	296.0	84.9	68	353.7	101.4	28	411.4	117.9	88	469.1	134.5	48	526.8	151.0
09	297.0	85.1	69	354.7	101.7	29	412.4	118.2	89	470.1	134.8	49	527.8	151.3
10	298.0	85.4	70	355.6	101.9	30	413.3	118.5	90	471.0	135.0	50	528.7	151.6
311	298.9	85.7	371	356.6	102.2	431	414.3	118.8	491	472.0	135.3	551	529.7	151.9
12	299.9	86.0	72	357.6	102.5	32	415.2	119.0	92	472.9	135.6	52	530.6	152.2
13	300.9	86.2	73	358.5	102.8	33	416.2	119.3	93	473.9	135.9	53	531.6	152.5
14	301.8	86.5	74	359.5	103.1	34	417.2	119.6	94	474.9	136.2	54	532.6	152.8
15	302.8	86.8	75	360.4	103.3	35	418.1	119.9	95	475.8	136.4	55	533.5	153.0
16	303.7	87.1	76	361.4	103.6	36	419.1	120.1	96	476.8	136.7	56	534.5	153.2
17	304.7	87.3	77	362.4	103.9	37	420.0	120.4	97	477.7	137.0	57	535.4	153.5
18	305.7	87.6	78	363.3	104.2	38	421.0	120.7	98	478.7	137.3	58	536.4	153.8
19	306.6	87.9	79	364.3	104.4	39	422.0	121.0	99	479.7	137.5	59	537.4	154.1
20	307.6	88.2	80	365.3	104.7	40	422.9	121.2	500	480.6	137.8	60	538.3	154.4
321	308.5	88.4	381	366.2	105.0	441	423.9	121.5	501	481.6	138.1	561	539.3	154.7
22	309.5	88.7	82	367.2	105.3	42	424.9	121.8	02	482.6	138.3	62	540.3	154.9
23	310.5	89.0	83	368.1	105.5	43	425.8	122.1	03	483.5	138.6	63	541.2	155.2
24	311.4	89.3	84	369.1	105.8	44	426.8	122.3	04	484.5	138.9	64	542.2	155.4
25	312.4	89.5	85	370.1	106.1	45	427.7	122.6	05	485.4	139.2	65	543.1	155.7
26	313.3	89.8	86	371.0	106.4	46	428.7	122.9	06	486.4	139.4	66	544.1	156.0
27	314.3	90.1	87	372.0	106.6	47	429.7	123.2	07	487.3	139.7	67	545.1	156.3
28	315.3	90.4	88	372.9	106.9	48	430.6	123.4	08	488.3	140.0	68	546.0	156.6
29	316.2	90.6	89	373.9	107.2	49	431.6	123.7	09	489.3	140.3	69	547.0	156.9
30	317.2	90.9	90	374.9	107.5	50	432.6	124.0	10	490.2	140.6	70	547.9	157.1
331	318.2	91.2	391	375.8	107.7	451	433.5	124.3	511	491.2	140.8	571	548.9	157.3
32	319.1	91.5	92	376.8	108.0	52	434.5	124.6	12	492.1	141.1	72	549.8	157.6
33	320.1	91.8	93	377.8	108.3	53	435.4	124.8	13	493.1	141.4	73	550.8	157.9
34	321.0	92.0	94	378.7	108.6	54	436.4	125.1	14	494.1	141.7	74	551.8	158.2
35	322.0	92.3	95	379.7	108.8	55	437.4	125.4	15	495.0	141.9	75	552.7	158.4
36	323.0	92.6	96	380.6	109.1	56	438.3	125.7	16	496.0	142.2	76	553.7	158.7
37	323.9	92.9	97	381.6	109.4	57	439.3	125.9	17	496.9	142.5	77	554.6	159.0
38	324.9	93.1	98	382.6	109.7	58	440.2	126.2	18	497.9	142.8	78	555.6	159.3
39	325.8	93.4	99	383.5	109.9	59	441.2	126.5	19	498.9	143.0	79	556.5	159.5
40	326.8	93.7	400	384.5	110.2	60	442.2	126.8	20	499.8	143.3	80	557.5	159.8
341	327.8	94.0	401	385.4	110.5	461	443.1	127.0	521	500.8	143.6	581	558.4	160.1
42	328.7	94.2	02	386.4	110.8	62	444.1	127.3	22	501.7	143.9	82	559.4	160.4
43	329.7	94.5	03	387.4	111.0	63	445.0	127.6	23	502.7	144.1	83	560.4	160.6
44	330.7	94.8	04	388.3	111.3	64	446.0	127.9	24	503.7	144.4	84	561.3	161.0
45	331.6	95.1	05	389.3	111.6	65	447.0	128.1	25	504.6	144.7	85	562.3	161.3
46	332.6	95.3	06	390.2	111.9	66	447.9	128.4	26	505.6	145.0	86	563.2	161.6
47	333.5	95.6	07	391.2	112.1	67	448.9	128.7	27	506.6	145.3	87	564.2	161.8
48	334.5	95.9	08	392.2	112.4	68	449.8	129.0	28	507.5	145.6	88	565.2	162.1
49	335.5	96.2	09	393.1	112.7	69	450.8	129.2	29	508.5	145.8	89	566.1	162.4
50	336.4	96.4	10	394.1	113.0	70	451.8	129.5	30	509.4	146.1	90	567.1	162.7
351	337.4	96.7	411	395.1	113.3	471	452.7	129.8	531	510.4	146.4	591	568.1	162.9
52	338.3	97.0	12	396.0	113.5	72	453.7	130.1	32	511.4	146.7	92	569.0	163.2
53	339.3	97.3	13	397.0	113.8	73	454.7	130.3	33	512.3	146.9	93	570.0	163.5
54	340.3	97.5	14	397.9	114.1	74	455.6	130.6	34	513.3	147.2	94	571.0	163.8
55	341.2	97.8	15	398.9	114.4	75	456.6	130.9	35	514.3	147.5	95	571.9	164.0
56	342.2	98.1	16	399.9	114.6	76	457.5	131.2	36	515.2	147.8	96	572.9	164.3
57	343.1	98.4	17	400.8	114.9	77	458.5	131.4	37	516.2	148.0	97	573.9	164.6
58	344.1	98.6	18	401.8	115.2	78	459.5	131.7	38	517.2	148.2	98	574.8	164.9
59	345.1	98.9	19	402.7	115.5	79	460.4	132.0	39	518.1	148.5	99	575.8	165.1
60	346.0	99.2	20	403.7	115.8	80	461.4	132.3	40	519.1	148.8	600	576.8	165.4
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

74° (106°, 254°, 286°).

TABLE 2.

Difference of Latitude and Departure for 17° (163°, 197°, 343°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.3	61	58.3	17.8	121	115.7	35.4	181	173.1	52.9	241	230.5	70.5
2	1.9	0.6	62	59.3	18.1	22	116.7	35.7	82	174.0	53.2	42	231.4	70.8
3	2.9	0.9	63	60.2	18.4	23	117.6	36.0	83	175.0	53.5	43	232.4	71.0
4	3.8	1.2	64	61.2	18.7	24	118.6	36.3	84	176.0	53.8	44	233.3	71.3
5	4.8	1.5	65	62.2	19.0	25	119.5	36.5	85	176.9	54.1	45	234.3	71.6
6	5.7	1.8	66	63.1	19.3	26	120.5	36.8	86	177.9	54.4	46	235.3	71.9
7	6.7	2.0	67	64.1	19.6	27	121.5	37.1	87	178.8	54.7	47	236.2	72.2
8	7.7	2.3	68	65.0	19.9	28	122.4	37.4	88	179.8	55.0	48	237.2	72.5
9	8.6	2.6	69	66.0	20.2	29	123.4	37.7	89	180.7	55.3	49	238.1	72.8
10	9.6	2.9	70	66.9	20.5	30	124.3	38.0	90	181.7	55.6	50	239.1	73.1
11	10.5	3.2	71	67.9	20.8	131	125.3	38.3	191	182.7	55.8	251	240.0	73.4
12	11.5	3.5	72	68.9	21.1	32	126.2	38.6	92	183.6	56.1	52	241.0	73.7
13	12.4	3.8	73	69.8	21.3	33	127.2	38.9	93	184.6	56.4	53	241.9	74.0
14	13.4	4.1	74	70.8	21.6	34	128.1	39.2	94	185.5	56.7	54	242.9	74.3
15	14.3	4.4	75	71.7	21.9	35	129.1	39.5	95	186.5	57.0	55	243.9	74.6
16	15.3	4.7	76	72.7	22.2	36	130.1	39.8	96	187.4	57.3	56	244.8	74.8
17	16.3	5.0	77	73.6	22.5	37	131.0	40.1	97	188.4	57.6	57	245.8	75.1
18	17.2	5.3	78	74.6	22.8	38	132.0	40.3	98	189.3	57.9	58	246.7	75.4
19	18.2	5.6	79	75.5	23.1	39	132.9	40.6	99	190.3	58.2	59	247.7	75.7
20	19.1	5.8	80	76.5	23.4	40	133.9	40.9	200	191.3	58.5	60	248.6	76.0
21	20.1	6.1	81	77.5	23.7	141	134.8	41.2	201	192.2	58.8	261	249.6	76.3
22	21.0	6.4	82	78.4	24.0	42	135.8	41.5	02	193.2	59.1	62	250.6	76.6
23	22.0	6.7	83	79.4	24.3	43	136.8	41.8	03	194.1	59.4	63	251.5	76.9
24	23.0	7.0	84	80.3	24.6	44	137.7	42.1	04	195.1	59.6	64	252.5	77.2
25	23.9	7.3	85	81.3	24.9	45	138.7	42.4	05	196.0	59.9	65	253.4	77.5
26	24.9	7.6	86	82.2	25.1	46	139.6	42.7	06	197.0	60.2	66	254.4	77.8
27	25.8	7.9	87	83.2	25.4	47	140.6	43.0	07	198.0	60.5	67	255.3	78.1
28	26.8	8.2	88	84.2	25.7	48	141.5	43.3	08	198.9	60.8	68	256.3	78.4
29	27.7	8.5	89	85.1	26.0	49	142.5	43.6	09	199.9	61.1	69	257.2	78.6
30	28.7	8.8	90	86.1	26.3	50	143.4	43.9	10	200.8	61.4	70	258.2	78.9
31	29.6	9.1	91	87.0	26.6	151	144.4	44.1	211	201.8	61.7	271	259.2	79.2
32	30.6	9.4	92	88.0	26.9	52	145.4	44.4	12	202.7	62.0	72	260.1	79.5
33	31.6	9.6	93	88.9	27.2	53	146.3	44.7	13	203.7	62.3	73	261.1	79.8
34	32.5	9.9	94	89.9	27.5	54	147.3	45.0	14	204.6	62.6	74	262.0	80.1
35	33.5	10.2	95	90.8	27.8	55	148.2	45.3	15	205.6	62.9	75	263.0	80.4
36	34.4	10.5	96	91.8	28.1	56	149.2	45.6	16	206.6	63.2	76	263.9	80.7
37	35.4	10.8	97	92.8	28.4	57	150.1	45.9	17	207.5	63.4	77	264.9	81.0
38	36.3	11.1	98	93.7	28.7	58	151.1	46.2	18	208.5	63.7	78	265.9	81.3
39	37.3	11.4	99	94.7	28.9	59	152.1	46.5	19	209.4	64.0	79	266.8	81.6
40	38.3	11.7	100	95.6	29.2	60	153.0	46.8	20	210.4	64.3	80	267.8	81.9
41	39.2	12.0	101	96.6	29.5	161	154.0	47.1	221	211.3	64.6	281	268.7	82.2
42	40.2	12.3	02	97.5	29.8	62	154.9	47.4	22	212.3	64.9	82	269.7	82.4
43	41.1	12.6	03	98.5	30.1	63	155.9	47.7	23	213.3	65.2	83	270.6	82.7
44	42.1	12.9	04	99.5	30.4	64	156.8	47.9	24	214.2	65.5	84	271.6	83.0
45	43.0	13.2	05	100.4	30.7	65	157.8	48.2	25	215.2	65.8	85	272.5	83.3
46	44.0	13.4	06	101.4	31.0	66	158.7	48.5	26	216.1	66.1	86	273.5	83.6
47	44.9	13.7	07	102.3	31.3	67	159.7	48.8	27	217.1	66.4	87	274.5	83.9
48	45.9	14.0	08	103.3	31.6	68	160.7	49.1	28	218.0	66.7	88	275.4	84.2
49	46.9	14.3	09	104.2	31.9	69	161.6	49.4	29	219.0	67.0	89	276.4	84.5
50	47.8	14.6	10	105.2	32.2	70	162.6	49.7	30	220.0	67.2	90	277.3	84.8
51	48.8	14.9	111	106.1	32.5	171	163.5	50.0	231	220.9	67.5	291	278.3	85.1
52	49.7	15.2	12	107.1	32.7	72	164.5	50.3	32	221.9	67.8	92	279.2	85.4
53	50.7	15.5	13	108.1	33.0	73	165.4	50.6	33	222.8	68.1	93	280.2	85.7
54	51.6	15.8	14	109.0	33.3	74	166.4	50.9	34	223.8	68.4	94	281.2	86.0
55	52.6	16.1	15	110.0	33.6	75	167.4	51.2	35	224.7	68.7	95	282.1	86.2
56	53.6	16.4	16	110.9	33.9	76	168.3	51.5	36	225.7	69.0	96	283.1	86.5
57	54.5	16.7	17	111.9	34.2	77	169.3	51.7	37	226.6	69.3	97	284.0	86.8
58	55.5	17.0	18	112.8	34.5	78	170.2	52.0	38	227.6	69.6	98	285.0	87.1
59	56.4	17.2	19	113.8	34.8	79	171.2	52.3	39	228.6	69.9	99	285.9	87.4
60	57.4	17.5	20	114.8	35.1	80	172.1	52.6	40	229.5	70.2	300	286.9	87.7
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

73° (107°, 253°, 287°).

TABLE 2.

Difference of Latitude and Departure for 17° (163°, 197°, 343°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	287.8	88.0	361	345.2	105.5	421	402.6	123.1	481	460.0	140.6	541	517.3	158.2
02	288.8	88.3	62	346.1	105.8	22	403.5	123.4	82	460.9	140.9	42	518.3	158.5
03	289.7	88.6	63	347.1	106.1	23	404.5	123.7	83	461.9	141.2	43	519.2	158.8
04	290.7	88.9	64	348.1	106.4	24	405.4	124.0	84	462.8	141.5	44	520.2	159.1
05	291.6	89.2	65	349.0	106.7	25	406.4	124.3	85	463.8	141.8	45	521.2	159.3
06	292.6	89.5	66	350.0	107.0	26	407.3	124.6	86	464.7	142.1	46	522.1	159.6
07	293.5	89.8	67	350.9	107.3	27	408.3	124.8	87	465.7	142.3	47	523.1	159.9
08	294.5	90.1	68	351.9	107.6	28	409.3	125.1	88	466.7	142.6	48	524.0	160.2
09	295.5	90.3	69	352.8	107.9	29	410.2	125.4	89	467.6	142.9	49	525.0	160.5
10	296.4	90.6	70	353.8	108.2	30	411.2	125.7	90	468.6	143.2	50	526.0	160.8
311	297.4	90.9	371	354.8	108.5	431	412.1	126.0	491	469.5	143.5	551	526.9	161.1
12	298.3	91.2	72	355.7	108.8	32	413.1	126.3	92	470.5	143.8	52	527.9	161.4
13	299.3	91.5	73	356.7	109.1	33	414.0	126.6	93	471.4	144.1	53	528.8	161.7
14	300.2	91.8	74	357.6	109.4	34	415.0	126.9	94	472.4	144.4	54	529.8	162.0
15	301.2	92.1	75	358.6	109.6	35	416.0	127.2	95	473.4	144.7	55	530.8	162.3
16	302.2	92.4	76	359.5	109.9	36	416.9	127.5	96	474.3	145.0	56	531.7	162.6
17	303.1	92.7	77	360.5	110.2	37	417.9	127.8	97	475.3	145.3	57	532.7	162.9
18	304.1	93.0	78	361.4	110.5	38	418.8	128.1	98	476.2	145.6	58	533.6	163.2
19	305.0	93.3	79	362.4	110.8	39	419.8	128.4	99	477.2	145.9	59	534.6	163.5
20	306.0	93.6	80	363.4	111.1	40	420.7	128.6	500	478.1	146.2	60	535.5	163.8
321	306.9	93.9	381	364.3	111.4	441	421.7	128.9	501	479.1	146.5	561	536.5	164.1
22	307.9	94.1	82	365.3	111.7	42	422.7	129.2	02	480.1	146.8	62	537.5	164.4
23	308.8	94.4	83	366.2	112.0	43	423.6	129.5	03	481.0	147.1	63	538.4	164.6
24	309.8	94.7	84	367.2	112.3	44	424.6	129.8	04	482.0	147.4	64	539.4	164.8
25	310.8	95.0	85	368.1	112.6	45	425.5	130.1	05	482.9	147.7	65	540.3	165.1
26	311.7	95.3	86	369.1	112.9	46	426.5	130.4	06	483.9	148.0	66	541.3	165.4
27	312.7	95.6	87	370.1	113.2	47	427.4	130.7	07	484.8	148.3	67	542.2	165.7
28	313.6	95.9	88	371.0	113.4	48	428.4	131.0	08	485.8	148.6	68	543.2	166.0
29	314.6	96.2	89	372.0	113.7	49	429.3	131.3	09	486.7	148.9	69	544.1	166.4
30	315.5	96.5	90	372.9	114.0	50	430.3	131.6	10	487.7	149.1	70	545.1	166.7
331	316.5	96.8	391	373.9	114.3	451	431.3	131.9	511	488.7	149.4	571	546.1	167.0
32	317.5	97.1	92	374.8	114.6	52	432.2	132.2	12	489.6	149.7	72	547.0	167.2
33	318.4	97.4	93	375.8	114.9	53	433.2	132.4	13	490.6	150.0	73	548.0	167.5
34	319.4	97.7	94	376.7	115.2	54	434.1	132.7	14	491.5	150.2	74	548.9	167.8
35	320.3	97.9	95	377.7	115.5	55	435.1	133.0	15	492.5	150.5	75	549.9	168.1
36	321.3	98.2	96	378.7	115.8	56	436.0	133.3	16	493.4	150.8	76	550.8	168.4
37	322.2	98.5	97	379.6	116.1	57	437.0	133.6	17	494.4	151.1	77	551.8	168.7
38	323.2	98.8	98	380.6	116.4	58	438.0	133.9	18	495.3	151.4	78	552.7	169.0
39	324.2	99.1	99	381.5	116.7	59	438.9	134.2	19	496.3	151.7	79	553.7	169.3
40	325.1	99.4	400	382.5	117.0	60	439.9	134.5	20	497.2	152.0	80	554.6	169.6
341	326.1	99.7	401	383.4	117.2	461	440.8	134.8	521	498.2	152.3	581	555.6	169.9
42	327.0	100.0	02	384.4	117.5	62	441.8	135.1	22	499.2	152.6	82	556.5	170.2
43	328.0	100.3	03	385.4	117.8	63	442.7	135.4	23	500.1	152.9	83	557.5	170.5
44	328.9	100.6	04	386.3	118.1	64	443.7	135.7	24	501.1	153.2	84	558.4	170.8
45	329.9	100.9	05	387.3	118.4	65	444.6	136.0	25	502.0	153.5	85	559.4	171.1
46	330.8	101.2	06	388.2	118.7	66	445.6	136.2	26	503.0	153.8	86	560.4	171.3
47	331.8	101.5	07	389.2	119.0	67	446.6	136.5	27	503.9	154.1	87	561.3	171.6
48	332.8	101.8	08	390.1	119.3	68	447.5	136.8	28	504.9	154.4	88	562.3	171.9
49	333.7	102.0	09	391.1	119.6	69	448.5	137.1	29	505.9	154.7	89	563.2	172.2
50	334.7	102.3	10	392.0	119.9	70	449.4	137.4	30	506.8	155.0	90	564.2	172.5
351	335.6	102.6	411	393.0	120.2	471	450.4	137.7	531	507.8	155.3	591	565.1	172.8
52	336.6	102.9	12	394.0	120.5	72	451.3	138.0	32	508.7	155.6	92	566.1	173.1
53	337.5	103.2	13	394.9	120.8	73	452.3	138.3	33	509.7	155.9	93	567.1	173.4
54	338.5	103.5	14	395.9	121.0	74	453.3	138.6	34	510.6	156.2	94	568.0	173.7
55	339.5	103.8	15	396.8	121.3	75	454.2	138.9	35	511.6	156.5	95	569.0	174.0
56	340.4	104.1	16	397.8	121.6	76	455.2	139.2	36	512.6	156.8	96	569.9	174.3
57	341.4	104.4	17	398.7	121.9	77	456.1	139.5	37	513.5	157.1	97	570.9	174.6
58	342.3	104.7	18	399.7	122.2	78	457.1	139.8	38	514.5	157.3	98	571.8	174.9
59	343.3	105.0	19	400.7	122.5	79	458.0	140.0	39	515.4	157.6	99	572.8	175.2
60	344.2	105.3	20	401.6	122.8	80	459.0	140.3	40	516.4	157.9	600	573.8	175.4
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

73° (107°, 253°, 287°).

TABLE 2.

Difference of Latitude and Departure for 18° (162°, 198°, 342°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	1.0	0.3	61	58.0	18.9	121	115.1	37.4	181	172.1	55.9	241	229.2	74.5
2	1.9	0.6	62	59.0	19.2	22	116.0	37.7	82	173.1	56.2	42	230.2	74.8
3	2.9	0.9	63	59.9	19.5	23	117.0	38.0	83	174.0	56.6	43	231.1	75.1
4	3.8	1.2	64	60.9	19.8	24	117.9	38.3	84	175.0	56.9	44	232.1	75.4
5	4.8	1.5	65	61.8	20.1	25	118.9	38.6	85	175.9	57.2	45	233.0	75.7
6	5.7	1.9	66	62.8	20.4	26	119.8	38.9	86	176.9	57.5	46	234.0	76.0
7	6.7	2.2	67	63.7	20.7	27	120.8	39.2	87	177.8	57.8	47	234.9	76.3
8	7.6	2.5	68	64.7	21.0	28	121.7	39.6	88	178.8	58.1	48	235.9	76.6
9	8.6	2.8	69	65.6	21.3	29	122.7	39.9	89	179.7	58.4	49	236.8	76.9
10	9.5	3.1	70	66.6	21.6	30	123.6	40.2	90	180.7	58.7	50	237.8	77.3
11	10.5	3.4	71	67.5	21.9	131	124.6	40.5	191	181.7	59.0	251	238.7	77.6
12	11.4	3.7	72	68.5	22.2	32	125.5	40.8	92	182.6	59.3	52	239.7	77.9
13	12.4	4.0	73	69.4	22.6	33	126.5	41.1	93	183.6	59.6	53	240.6	78.2
14	13.3	4.3	74	70.4	22.9	34	127.4	41.4	94	184.5	59.9	54	241.6	78.5
15	14.3	4.6	75	71.3	23.2	35	128.4	41.7	95	185.5	60.3	55	242.5	78.8
16	15.2	4.9	76	72.3	23.5	36	129.3	42.0	96	186.4	60.6	56	243.5	79.1
17	16.2	5.3	77	73.2	23.8	37	130.3	42.3	97	187.4	60.9	57	244.4	79.4
18	17.1	5.6	78	74.2	24.1	38	131.2	42.6	98	188.3	61.2	58	245.4	79.7
19	18.1	5.9	79	75.1	24.4	39	132.2	43.0	99	189.3	61.5	59	246.3	80.0
20	19.0	6.2	80	76.1	24.7	40	133.1	43.3	200	190.2	61.8	60	247.3	80.3
21	20.0	6.5	81	77.0	25.0	141	134.1	43.6	201	191.2	62.1	261	248.2	80.7
22	20.9	6.8	82	78.0	25.3	42	135.1	43.9	02	192.1	62.4	62	249.2	81.0
23	21.9	7.1	83	78.9	25.6	43	136.0	44.2	03	193.1	62.7	63	250.1	81.3
24	22.8	7.4	84	79.9	26.0	44	137.0	44.5	04	194.0	63.0	64	251.1	81.6
25	23.8	7.7	85	80.8	26.3	45	137.9	44.8	05	195.0	63.3	65	252.0	81.9
26	24.7	8.0	86	81.8	26.6	46	138.9	45.1	06	195.9	63.7	66	253.0	82.2
27	25.7	8.3	87	82.7	26.9	47	139.8	45.4	07	196.9	64.0	67	253.9	82.5
28	26.6	8.7	88	83.7	27.2	48	140.8	45.7	08	197.8	64.3	68	254.9	82.8
29	27.6	9.0	89	84.6	27.5	49	141.7	46.0	09	198.8	64.6	69	255.8	83.1
30	28.5	9.3	90	85.6	27.8	50	142.7	46.4	10	199.7	64.9	70	256.8	83.4
31	29.5	9.6	91	86.5	28.1	151	143.6	46.7	211	200.7	65.2	271	257.7	83.7
32	30.4	9.9	92	87.5	28.4	52	144.6	47.0	12	201.6	65.5	72	258.7	84.1
33	31.4	10.2	93	88.4	28.7	53	145.5	47.3	13	202.6	65.8	73	259.6	84.4
34	32.3	10.5	94	89.4	29.0	54	146.5	47.6	14	203.5	66.1	74	260.6	84.7
35	33.3	10.8	95	90.4	29.4	55	147.4	47.9	15	204.5	66.4	75	261.5	85.0
36	34.2	11.1	96	91.3	29.7	56	148.4	48.2	16	205.4	66.7	76	262.5	85.3
37	35.2	11.4	97	92.3	30.0	57	149.3	48.5	17	206.4	67.1	77	263.4	85.6
38	36.1	11.7	98	93.2	30.3	58	150.3	48.8	18	207.3	67.4	78	264.4	85.9
39	37.1	12.1	99	94.2	30.6	59	151.2	49.1	19	208.3	67.7	79	265.3	86.2
40	38.0	12.4	100	95.1	30.9	60	152.2	49.4	20	209.2	68.0	80	266.3	86.5
41	39.0	12.7	101	96.1	31.2	161	153.1	49.8	221	210.2	68.3	281	267.2	86.8
42	39.9	13.0	02	97.0	31.5	62	154.1	50.1	22	211.1	68.6	82	268.2	87.1
43	40.9	13.3	03	98.0	31.8	63	155.0	50.4	23	212.1	68.9	83	269.1	87.5
44	41.8	13.6	04	98.9	32.1	64	156.0	50.7	24	213.0	69.2	84	270.1	87.8
45	42.8	13.9	05	99.9	32.4	65	156.9	51.0	25	214.0	69.5	85	271.1	88.1
46	43.7	14.2	06	100.8	32.8	66	157.9	51.3	26	214.9	69.8	86	272.0	88.4
47	44.7	14.5	07	101.8	33.1	67	158.8	51.6	27	215.9	70.1	87	273.0	88.7
48	45.7	14.8	08	102.7	33.4	68	159.8	51.9	28	216.8	70.5	88	273.9	89.0
49	46.6	15.1	09	103.7	33.7	69	160.7	52.2	29	217.8	70.8	89	274.9	89.3
50	47.6	15.5	10	104.6	34.0	70	161.7	52.5	30	218.7	71.1	90	275.8	89.6
51	48.5	15.8	111	105.6	34.3	171	162.6	52.8	231	219.7	71.4	291	276.8	89.9
52	49.5	16.1	12	106.5	34.6	72	163.6	53.2	32	220.6	71.7	92	277.7	90.2
53	50.4	16.4	13	107.5	34.9	73	164.5	53.5	33	221.6	72.0	93	278.7	90.5
54	51.4	16.7	14	108.4	35.2	74	165.5	53.8	34	222.5	72.3	94	279.6	90.9
55	52.3	17.0	15	109.4	35.5	75	166.4	54.1	35	223.5	72.6	95	280.6	91.2
56	53.3	17.3	16	110.3	35.8	76	167.4	54.4	36	224.4	72.9	96	281.5	91.5
57	54.2	17.6	17	111.3	36.2	77	168.3	54.7	37	225.4	73.2	97	282.5	91.8
58	55.2	17.9	18	112.2	36.5	78	169.3	55.0	38	226.4	73.5	98	283.4	92.1
59	56.1	18.2	19	113.2	36.8	79	170.2	55.3	39	227.3	73.9	99	284.4	92.4
60	57.1	18.5	20	114.1	37.1	80	171.2	55.6	40	228.3	74.2	300	285.3	92.7
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

72° (108°, 252°, 288°).

TABLE 2.

Difference of Latitude and Departure for 18° (162°, 198°, 342°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	286.3	93.0	361	343.3	111.6	421	400.4	130.1	481	457.5	148.6	541	514.5	167.2
02	287.2	93.3	62	344.3	111.9	22	401.4	130.4	82	458.5	148.9	42	515.5	167.5
03	288.2	93.7	63	345.2	112.2	23	402.3	130.7	83	459.4	149.3	43	516.4	167.9
04	289.1	94.0	64	346.2	112.5	24	403.3	131.0	84	460.4	149.6	44	517.4	168.2
05	290.1	94.3	65	347.1	112.8	25	404.2	131.3	85	461.3	149.9	45	518.3	168.5
06	291.0	94.6	66	348.1	113.1	26	405.2	131.7	86	462.3	150.2	46	519.3	168.8
07	292.0	94.9	67	349.0	113.4	27	406.1	132.0	87	463.2	150.5	47	520.2	169.1
08	292.9	95.2	68	350.0	113.7	28	407.1	132.3	88	464.2	150.8	48	521.2	169.4
09	293.9	95.5	69	350.9	114.0	29	408.0	132.6	89	465.1	151.1	49	522.1	169.7
10	294.8	95.8	70	351.9	114.3	30	409.0	132.9	90	466.1	151.4	50	523.1	170.0
311	295.8	96.1	371	352.9	114.7	431	409.9	133.2	491	467.0	151.7	551	524.0	170.3
12	296.7	96.4	72	353.8	115.0	32	410.9	133.5	92	468.0	152.0	52	525.0	170.6
13	297.7	96.7	73	354.8	115.3	33	411.8	133.8	93	468.9	152.3	53	525.9	170.9
14	298.6	97.0	74	355.7	115.6	34	412.8	134.1	94	469.8	152.6	54	526.9	171.2
15	299.6	97.4	75	356.7	115.9	35	413.7	134.4	95	470.8	153.0	55	527.8	171.5
16	300.5	97.7	76	357.6	116.2	36	414.7	134.7	96	471.7	153.3	56	528.8	171.8
17	301.5	98.0	77	358.6	116.5	37	415.6	135.1	97	472.7	153.6	57	529.7	172.1
18	302.4	98.3	78	359.5	116.8	38	416.6	135.4	98	473.6	153.9	58	530.7	172.4
19	303.4	98.6	79	360.5	117.1	39	417.5	135.7	99	474.6	154.2	59	531.6	172.7
20	304.3	98.9	80	361.4	117.4	40	418.5	136.0	500	475.5	154.5	60	532.6	173.0
321	305.3	99.2	381	362.4	117.7	441	419.4	136.3	501	476.5	154.8	561	533.5	173.3
22	306.2	99.5	82	363.3	118.1	42	420.4	136.6	02	477.4	155.1	62	534.5	173.6
23	307.2	99.8	83	364.3	118.4	43	421.3	136.9	03	478.4	155.4	63	535.4	173.9
24	308.2	100.1	84	365.2	118.7	44	422.3	137.2	04	479.3	155.7	64	536.4	174.2
25	309.1	100.4	85	366.2	119.0	45	423.2	137.5	05	480.3	156.1	65	537.3	174.6
26	310.1	100.7	86	367.1	119.3	46	424.2	137.8	06	481.2	156.4	66	538.3	174.9
27	311.0	101.1	87	368.1	119.6	47	425.1	138.1	07	482.2	156.7	67	539.2	175.2
28	312.0	101.4	88	369.0	119.9	48	426.1	138.4	08	483.2	157.0	68	540.2	175.5
29	312.9	101.7	89	370.0	120.2	49	427.0	138.8	09	484.1	157.3	69	541.1	175.8
30	313.9	102.0	90	370.9	120.5	50	428.0	139.1	10	485.1	157.6	70	542.1	176.1
331	314.8	102.3	391	371.9	120.8	451	428.9	139.4	511	486.0	157.9	571	543.0	176.4
32	315.8	102.6	92	372.8	121.1	52	429.9	139.7	12	487.0	158.2	72	544.0	176.7
33	316.7	102.9	93	373.8	121.5	53	430.8	140.0	13	487.9	158.5	73	544.9	177.0
34	317.7	103.2	94	374.7	121.8	54	431.8	140.3	14	488.9	158.8	74	545.9	177.3
35	318.6	103.5	95	375.7	122.1	55	432.7	140.6	15	489.8	159.1	75	546.8	177.6
36	319.6	103.8	96	376.6	122.4	56	433.7	140.9	16	490.8	159.4	76	547.8	178.0
37	320.5	104.1	97	377.6	122.7	57	434.6	141.2	17	491.7	159.7	77	548.7	178.3
38	321.5	104.5	98	378.5	123.0	58	435.6	141.5	18	492.7	160.0	78	549.7	178.6
39	322.4	104.8	99	379.5	123.3	59	436.5	141.8	19	493.6	160.3	79	550.6	178.9
40	323.4	105.1	400	380.4	123.6	60	437.5	142.2	20	494.6	160.7	80	551.6	179.2
341	324.3	105.4	401	381.4	123.9	461	438.4	142.5	521	495.5	161.0	581	552.5	179.5
42	325.3	105.7	02	382.3	124.2	62	439.4	142.8	22	496.5	161.3	82	553.5	179.8
43	326.2	106.0	03	383.3	124.5	63	440.3	143.1	23	497.4	161.6	83	554.4	180.1
44	327.2	106.3	04	384.2	124.9	64	441.3	143.4	24	498.4	161.9	84	555.4	180.4
45	328.1	106.6	05	385.2	125.2	65	442.2	143.7	25	499.3	162.2	85	556.3	180.7
46	329.1	106.9	06	386.1	125.5	66	443.2	144.0	26	500.3	162.5	86	557.3	181.1
47	330.0	107.2	07	387.1	125.8	67	444.2	144.3	27	501.2	162.9	87	558.2	181.4
48	331.0	107.5	08	388.0	126.1	68	445.1	144.6	28	502.2	163.2	88	559.2	181.7
49	331.9	107.9	09	389.0	126.4	69	446.1	144.9	29	503.1	163.5	89	560.1	182.0
50	332.9	108.2	10	389.9	126.7	70	447.0	145.2	30	504.1	163.8	90	561.1	182.3
351	333.8	108.5	411	390.9	127.0	471	448.0	145.6	531	505.0	164.1	591	562.0	182.7
52	334.8	108.8	12	391.8	127.3	72	448.9	145.9	32	506.0	164.4	92	563.0	183.0
53	335.7	109.1	13	392.8	127.6	73	449.9	146.2	33	506.9	164.7	93	563.9	183.3
54	336.7	109.4	14	393.7	127.9	74	450.8	146.5	34	507.9	165.0	94	564.9	183.6
55	337.6	109.7	15	394.7	128.3	75	451.8	146.8	35	508.8	165.3	95	565.8	183.9
56	338.6	110.0	16	395.6	128.6	76	452.7	147.1	36	509.8	165.6	96	566.8	184.2
57	339.5	110.3	17	396.6	128.9	77	453.7	147.4	37	510.7	165.9	97	567.7	184.5
58	340.5	110.6	18	397.5	129.2	78	454.6	147.7	38	511.7	166.2	98	568.7	184.8
59	341.4	110.9	19	398.5	129.5	79	455.6	148.0	39	512.6	166.5	99	569.6	185.1
60	342.4	111.3	20	399.5	129.8	80	456.5	148.3	40	513.6	166.9	600	570.6	185.4
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

72° (108, 252°, 288°).

TABLE 2.

Difference of Latitude and Departure for 19° (161°, 199°, 341°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.9	0.3	61	57.7	19.9	121	114.4	39.4	181	171.1	58.9	241	227.9	78.5
2	1.9	0.7	62	58.6	20.2	22	115.4	39.7	82	172.1	59.3	42	228.8	78.8
3	2.8	1.0	63	59.6	20.5	23	116.3	40.0	83	173.0	59.6	43	229.8	79.1
4	3.8	1.3	64	60.5	20.8	24	117.2	40.4	84	174.0	59.9	44	230.7	79.4
5	4.7	1.6	65	61.5	21.2	25	118.2	40.7	85	174.9	60.2	45	231.7	79.8
6	5.7	2.0	66	62.4	21.5	26	119.1	41.0	86	175.9	60.6	46	232.6	80.1
7	6.6	2.3	67	63.3	21.8	27	120.1	41.3	87	176.8	60.9	47	233.5	80.4
8	7.6	2.6	68	64.3	22.1	28	121.0	41.7	88	177.8	61.2	48	234.5	80.7
9	8.5	2.9	69	65.2	22.5	29	122.0	42.0	89	178.7	61.5	49	235.4	81.1
10	9.5	3.3	70	66.2	22.8	30	122.9	42.3	90	179.6	61.9	50	236.4	81.4
11	10.4	3.6	71	67.1	23.1	131	123.9	42.6	191	180.6	62.2	251	237.3	81.7
12	11.3	3.9	72	68.1	23.4	32	124.8	43.0	92	181.5	62.5	52	238.3	82.0
13	12.3	4.2	73	69.0	23.8	33	125.8	43.3	93	182.5	62.8	53	239.2	82.4
14	13.2	4.6	74	70.0	24.1	34	126.7	43.6	94	183.4	63.2	54	240.2	82.7
15	14.2	4.9	75	70.9	24.4	35	127.6	44.0	95	184.4	63.5	55	241.1	83.0
16	15.1	5.2	76	71.9	24.7	36	128.6	44.3	96	185.3	63.8	56	242.1	83.3
17	16.1	5.5	77	72.8	25.1	37	129.5	44.6	97	186.3	64.1	57	243.0	83.7
18	17.0	5.9	78	73.8	25.4	38	130.5	44.9	98	187.2	64.5	58	243.9	84.0
19	18.0	6.2	79	74.7	25.7	39	131.4	45.3	99	188.2	64.8	59	244.9	84.3
20	18.9	6.5	80	75.6	26.0	40	132.4	45.6	200	189.1	65.1	60	245.8	84.6
21	19.9	6.8	81	76.6	26.4	141	133.3	45.9	201	190.0	65.4	261	246.8	85.0
22	20.8	7.2	82	77.5	26.7	42	134.3	46.2	02	191.0	65.8	62	247.7	85.3
23	21.7	7.5	83	78.5	27.0	43	135.2	46.6	03	191.9	66.1	63	248.7	85.6
24	22.7	7.8	84	79.4	27.3	44	136.2	46.9	04	192.9	66.4	64	249.6	86.0
25	23.6	8.1	85	80.4	27.7	45	137.1	47.2	05	193.8	66.7	65	250.6	86.3
26	24.6	8.5	86	81.3	28.0	46	138.0	47.5	06	194.8	67.1	66	251.5	86.6
27	25.5	8.8	87	82.3	28.3	47	139.0	47.9	07	195.7	67.4	67	252.5	86.9
28	26.5	9.1	88	83.2	28.7	48	139.9	48.2	08	196.7	67.7	68	253.4	87.3
29	27.4	9.4	89	84.2	29.0	49	140.9	48.5	09	197.6	68.0	69	254.3	87.6
30	28.4	9.8	90	85.1	29.3	50	141.8	48.8	10	198.6	68.4	70	255.3	87.9
31	29.3	10.1	91	86.0	29.6	151	142.8	49.2	211	199.5	68.7	271	256.2	88.2
32	30.3	10.4	92	87.0	30.0	52	143.7	49.5	12	200.4	69.0	72	257.2	88.6
33	31.2	10.7	93	87.9	30.3	53	144.7	49.8	13	201.4	69.3	73	258.1	88.9
34	32.1	11.1	94	88.9	30.6	54	145.6	50.1	14	202.3	69.7	74	259.1	89.2
35	33.1	11.4	95	89.8	30.9	55	146.6	50.5	15	203.3	70.0	75	260.0	89.5
36	34.0	11.7	96	90.8	31.3	56	147.5	50.8	16	204.2	70.3	76	261.0	89.9
37	35.0	12.0	97	91.7	31.6	57	148.4	51.1	17	205.2	70.6	77	261.9	90.2
38	35.9	12.4	98	92.7	31.9	58	149.4	51.4	18	206.1	71.0	78	262.9	90.5
39	36.9	12.7	99	93.6	32.2	59	150.3	51.8	19	207.1	71.3	79	263.8	90.8
40	37.8	13.0	100	94.6	32.6	60	151.3	52.1	20	208.0	71.6	80	264.7	91.2
41	38.8	13.3	101	95.5	32.9	161	152.2	52.4	221	209.0	72.0	281	265.7	91.5
42	39.7	13.7	02	96.4	33.2	62	153.2	52.7	22	209.9	72.3	82	266.6	91.8
43	40.7	14.0	03	97.4	33.5	63	154.1	53.1	23	210.9	72.6	83	267.6	92.1
44	41.6	14.3	04	98.3	33.9	64	155.1	53.4	24	211.8	72.9	84	268.5	92.5
45	42.5	14.7	05	99.3	34.2	65	156.0	53.7	25	212.7	73.3	85	269.5	92.8
46	43.5	15.0	06	100.2	34.5	66	157.0	54.0	26	213.7	73.6	86	270.4	93.1
47	44.4	15.3	07	101.2	34.8	67	157.9	54.4	27	214.6	73.9	87	271.4	93.4
48	45.4	15.6	08	102.1	35.2	68	158.8	54.7	28	215.6	74.2	88	272.3	93.8
49	46.3	16.0	09	103.1	35.5	69	159.8	55.0	29	216.5	74.6	89	273.3	94.1
50	47.3	16.3	10	104.0	35.8	70	160.7	55.3	30	217.5	74.9	90	274.2	94.4
51	48.2	16.6	111	105.0	36.1	171	161.7	55.7	231	218.4	75.2	291	275.1	94.7
52	49.2	16.9	12	105.9	36.5	72	162.6	56.0	32	219.4	75.5	92	276.1	95.1
53	50.1	17.3	13	106.8	36.8	73	163.6	56.3	33	220.3	75.9	93	277.0	95.4
54	51.1	17.6	14	107.8	37.1	74	164.5	56.6	34	221.3	76.2	94	278.0	95.7
55	52.0	17.9	15	108.7	37.4	75	165.5	57.0	35	222.2	76.5	95	278.9	96.0
56	52.9	18.2	16	109.7	37.8	76	166.4	57.3	36	223.1	76.8	96	279.9	96.4
57	53.9	18.6	17	110.6	38.1	77	167.4	57.6	37	224.1	77.2	97	280.8	96.7
58	54.8	18.9	18	111.6	38.4	78	168.3	58.0	38	225.0	77.5	98	281.8	97.0
59	55.8	19.2	19	112.5	38.7	79	169.2	58.3	39	226.0	77.8	99	282.7	97.3
60	56.7	19.5	20	113.5	39.1	80	170.2	58.6	40	226.9	78.1	300	283.7	97.7
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

71° (109°, 251°, 289°).

TABLE 2.

Difference of Latitude and Departure for 19° (161°, 199°, 341°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	284.6	98.0	361	341.3	117.5	421	398.1	137.0	481	454.8	156.6	541	511.5	176.1
02	285.5	98.3	62	342.3	117.8	22	399.0	137.4	82	455.7	156.9	42	512.4	176.4
03	286.5	98.6	63	343.2	118.2	23	400.0	137.7	83	456.7	157.2	43	513.4	176.8
04	287.4	99.0	64	344.2	118.5	24	400.9	138.0	84	457.6	157.6	44	514.3	177.1
05	288.4	99.3	65	345.1	118.8	25	401.8	138.4	85	458.6	157.9	45	515.3	177.4
06	289.3	99.6	66	346.1	119.1	26	402.8	138.7	86	459.5	158.2	46	516.2	177.7
07	290.3	99.9	67	347.0	119.5	27	403.7	139.0	87	460.5	158.5	47	517.2	178.1
08	291.2	100.3	68	348.0	119.8	28	404.7	139.3	88	461.4	158.9	48	518.1	178.4
09	292.2	100.6	69	348.9	120.1	29	405.6	139.7	89	462.4	159.2	49	519.1	178.7
10	293.1	100.9	70	349.8	120.4	30	406.6	140.0	90	463.3	159.5	50	520.0	179.0
311	294.1	101.2	371	350.8	120.8	431	407.5	140.3	491	464.3	159.8	551	521.0	179.4
12	295.0	101.6	72	351.7	121.1	32	408.5	140.6	92	465.2	160.2	52	521.9	179.7
13	295.9	101.9	73	352.7	121.4	33	409.4	141.0	93	466.1	160.5	53	522.8	180.0
14	296.9	102.2	74	353.6	121.7	34	410.4	141.3	94	467.1	160.8	54	523.8	180.3
15	297.8	102.5	75	354.6	122.1	35	411.3	141.6	95	468.0	161.1	55	524.7	180.7
16	298.8	102.9	76	355.5	122.4	36	412.2	141.9	96	469.0	161.5	56	525.7	181.0
17	299.7	103.2	77	356.5	122.7	37	413.2	142.3	97	469.9	161.8	57	526.6	181.3
18	300.7	103.5	78	357.4	123.0	38	414.1	142.6	98	470.9	162.1	58	527.6	181.6
19	301.6	103.8	79	358.4	123.4	39	415.1	142.9	99	471.8	162.4	59	528.5	182.0
20	302.6	104.2	80	359.3	123.7	40	416.0	143.2	500	472.8	162.8	60	529.5	182.3
321	303.5	104.5	381	360.2	124.0	441	417.0	143.6	501	473.7	163.1	561	530.4	182.6
22	304.5	104.8	82	361.2	124.4	42	417.9	143.9	02	474.7	163.4	62	531.4	182.9
23	305.4	105.1	83	362.1	124.7	43	418.9	144.2	03	475.6	163.7	63	532.3	183.3
24	306.3	105.5	84	363.1	125.0	44	419.8	144.5	04	476.5	164.1	64	533.2	183.6
25	307.3	105.8	85	364.0	125.3	45	420.8	144.9	05	477.5	164.4	65	534.2	183.9
26	308.2	106.1	86	365.0	125.7	46	421.7	145.2	06	478.4	164.7	66	535.1	184.2
27	309.2	106.4	87	365.9	126.0	47	422.6	145.5	07	479.4	165.0	67	536.1	184.6
28	310.1	106.8	88	366.9	126.3	48	423.6	145.8	08	480.3	165.4	68	537.0	184.9
29	311.1	107.1	89	367.8	126.6	49	424.5	146.2	09	481.2	165.7	69	538.0	185.2
30	312.0	107.4	90	368.8	127.0	50	425.5	146.5	10	482.2	166.1	70	538.9	185.6
331	313.0	107.7	391	369.7	127.3	451	426.4	146.8	511	483.1	166.4	571	539.9	185.9
32	313.9	108.1	92	370.6	127.6	52	427.4	147.1	12	484.1	166.7	72	540.8	186.2
33	314.9	108.4	93	371.6	127.9	53	428.3	147.5	13	485.0	167.0	73	541.7	186.5
34	315.8	108.7	94	372.5	128.3	54	429.3	147.8	14	486.0	167.4	74	542.7	186.9
35	316.7	109.1	95	373.5	128.6	55	430.2	148.1	15	486.9	167.7	75	543.6	187.2
36	317.7	109.4	96	374.4	128.9	56	431.2	148.4	16	487.9	168.0	76	544.6	187.5
37	318.6	109.7	97	375.4	129.2	57	432.1	148.8	17	488.8	168.3	77	545.5	187.8
38	319.6	110.0	98	376.3	129.6	58	433.0	149.1	18	489.7	168.7	78	546.5	188.2
39	320.5	110.4	99	377.3	129.9	59	434.0	149.4	19	490.7	169.0	79	547.4	188.5
40	321.5	110.7	400	378.2	130.2	60	434.9	149.7	20	491.6	169.3	80	548.4	188.8
341	322.4	111.0	401	379.2	130.5	461	435.9	150.1	521	492.6	169.6	581	549.3	189.1
42	323.4	111.3	02	380.1	130.9	62	436.8	150.4	22	493.5	170.0	82	550.3	189.5
43	324.3	111.7	03	381.0	131.2	63	437.8	150.7	23	494.5	170.3	83	551.2	189.8
44	325.3	112.0	04	382.0	131.5	64	438.7	151.0	24	495.4	170.6	84	552.2	190.1
45	326.2	112.3	05	382.9	131.8	65	439.7	151.4	25	496.4	170.9	85	553.1	190.4
46	327.1	112.6	06	383.9	132.2	66	440.6	151.7	26	497.3	171.2	86	554.1	190.8
47	328.1	113.0	07	384.8	132.5	67	441.6	152.0	27	498.3	171.6	87	555.0	191.1
48	329.0	113.3	08	385.8	132.8	68	442.5	152.4	28	499.2	171.9	88	555.9	191.4
49	330.0	113.6	09	386.7	133.1	69	443.4	152.7	29	500.1	172.2	89	556.9	191.7
50	330.9	113.9	10	387.7	133.5	70	444.4	153.0	30	501.1	172.5	90	557.8	192.1
351	331.9	114.3	411	388.6	133.8	471	445.3	153.3	531	502.0	172.9	591	558.8	192.4
52	332.8	114.6	12	389.6	134.1	72	446.3	153.7	32	503.0	173.2	92	559.7	192.7
53	333.8	114.9	13	390.5	134.4	73	447.2	154.0	33	503.9	173.5	93	560.7	193.0
54	334.7	115.2	14	391.4	134.8	74	448.2	154.3	34	504.9	173.8	94	561.6	193.4
55	335.7	115.6	15	392.4	135.1	75	449.1	154.6	35	505.8	174.2	95	562.6	193.7
56	336.6	115.9	16	393.3	135.4	76	450.1	155.0	36	506.8	174.5	96	563.5	194.0
57	337.5	116.2	17	394.3	135.7	77	451.0	155.3	37	507.7	174.8	97	564.5	194.3
58	338.5	116.5	18	395.2	136.1	78	452.0	155.6	38	508.7	175.1	98	565.4	194.7
59	339.4	116.9	19	396.2	136.4	79	452.9	155.9	39	509.6	175.5	99	566.4	195.0
60	340.4	117.2	20	397.1	136.7	80	453.8	156.3	40	510.6	175.8	600	567.3	195.3
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

71° (109°, 251°, 289°).

TABLE 2.

Difference of Latitude and Departure for 20° (160°, 200°, 340°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.9	0.3	61	57.3	20.9	121	113.7	41.4	181	170.1	61.9	241	226.5	82.4
2	1.9	0.7	62	58.3	21.2	22	114.6	41.7	82	171.0	62.2	42	227.4	82.8
3	2.8	1.0	63	59.2	21.5	23	115.6	42.1	83	172.0	62.6	43	228.3	83.1
4	3.8	1.4	64	60.1	21.9	24	116.5	42.4	84	172.9	62.9	44	229.3	83.5
5	4.7	1.7	65	61.1	22.2	25	117.5	42.8	85	173.8	63.3	45	230.2	83.8
6	5.6	2.1	66	62.0	22.6	26	118.4	43.1	86	174.8	63.6	46	231.2	84.1
7	6.6	2.4	67	63.0	22.9	27	119.3	43.4	87	175.7	64.0	47	232.1	84.5
8	7.5	2.7	68	63.9	23.3	28	120.3	43.8	88	176.7	64.3	48	233.0	84.8
9	8.5	3.1	69	64.8	23.6	29	121.2	44.1	89	177.6	64.6	49	234.0	85.2
10	9.4	3.4	70	65.8	23.9	30	122.2	44.5	90	178.5	65.0	50	234.9	85.5
11	10.3	3.8	71	66.7	24.3	131	123.1	44.8	191	179.5	65.3	251	235.9	85.8
12	11.3	4.1	72	67.7	24.6	32	124.0	45.1	92	180.4	65.7	52	236.8	86.2
13	12.2	4.4	73	68.6	25.0	33	125.0	45.5	93	181.4	66.0	53	237.7	86.5
14	13.2	4.8	74	69.5	25.3	34	125.9	45.8	94	182.3	66.4	54	238.7	86.9
15	14.1	5.1	75	70.5	25.7	35	126.9	46.2	95	183.2	66.7	55	239.6	87.2
16	15.0	5.5	76	71.4	26.0	36	127.8	46.5	96	184.2	67.0	56	240.6	87.6
17	16.0	5.8	77	72.4	26.3	37	128.7	46.9	97	185.1	67.4	57	241.5	87.9
18	16.9	6.2	78	73.3	26.7	38	129.7	47.2	98	186.1	67.7	58	242.4	88.2
19	17.9	6.5	79	74.2	27.0	39	130.6	47.5	99	187.0	68.1	59	243.4	88.6
20	18.8	6.8	80	75.2	27.4	40	131.6	47.9	200	187.9	68.4	60	244.3	88.9
21	19.7	7.2	81	76.1	27.7	141	132.5	48.2	201	188.9	68.7	261	245.3	89.3
22	20.7	7.5	82	77.1	28.0	42	133.4	48.6	02	189.8	69.1	62	246.2	89.6
23	21.6	7.9	83	78.0	28.4	43	134.4	48.9	03	190.8	69.4	63	247.1	90.0
24	22.6	8.2	84	78.9	28.7	44	135.3	49.3	04	191.7	69.8	64	248.1	90.3
25	23.5	8.6	85	79.9	29.1	45	136.3	49.6	05	192.6	70.1	65	249.0	90.6
26	24.4	8.9	86	80.8	29.4	46	137.2	49.9	06	193.6	70.5	66	250.0	91.0
27	25.4	9.2	87	81.8	29.8	47	138.1	50.3	07	194.5	70.8	67	250.9	91.3
28	26.3	9.6	88	82.7	30.1	48	139.1	50.6	08	195.5	71.1	68	251.8	91.7
29	27.3	9.9	89	83.6	30.4	49	140.0	51.0	09	196.4	71.5	69	252.8	92.0
30	28.2	10.3	90	84.6	30.8	50	140.9	51.3	10	197.3	71.8	70	253.7	92.3
31	29.1	10.6	91	85.5	31.1	151	141.9	51.6	211	198.3	72.2	271	254.7	92.7
32	30.1	10.9	92	86.5	31.5	52	142.8	52.0	12	199.2	72.5	72	255.6	93.0
33	31.0	11.3	93	87.4	31.8	53	143.8	52.3	13	200.2	72.9	73	256.5	93.4
34	31.9	11.6	94	88.3	32.1	54	144.7	52.7	14	201.1	73.2	74	257.5	93.7
35	32.9	12.0	95	89.3	32.5	55	145.7	53.0	15	202.0	73.5	75	258.4	94.1
36	33.8	12.3	96	90.2	32.8	56	146.6	53.4	16	203.0	73.9	76	259.4	94.4
37	34.8	12.7	97	91.2	33.2	57	147.5	53.7	17	203.9	74.2	77	260.3	94.7
38	35.7	13.0	98	92.1	33.5	58	148.5	54.0	18	204.9	74.6	78	261.2	95.1
39	36.6	13.3	99	93.0	33.9	59	149.4	54.4	19	205.8	74.9	79	262.2	95.4
40	37.6	13.7	100	94.0	34.2	60	150.4	54.7	20	206.7	75.2	80	263.1	95.8
41	38.5	14.0	101	94.9	34.5	161	151.3	55.1	221	207.7	75.6	281	264.1	96.1
42	39.5	14.4	02	95.8	34.9	62	152.2	55.4	22	208.6	75.9	82	265.0	96.4
43	40.4	14.7	03	96.8	35.2	63	153.2	55.7	23	209.6	76.3	83	265.9	96.8
44	41.3	15.0	04	97.7	35.6	64	154.1	56.1	24	210.5	76.6	84	266.9	97.1
45	42.3	15.4	05	98.7	35.9	65	155.0	56.4	25	211.4	77.0	85	267.8	97.5
46	43.2	15.7	06	99.6	36.3	66	156.0	56.8	26	212.4	77.3	86	268.8	97.8
47	44.2	16.1	07	100.5	36.6	67	156.9	57.1	27	213.3	77.6	87	269.7	98.2
48	45.1	16.4	08	101.5	36.9	68	157.9	57.5	28	214.2	78.0	88	270.6	98.5
49	46.0	16.8	09	102.4	37.3	69	158.8	57.8	29	215.2	78.3	89	271.6	98.8
50	47.0	17.1	10	103.4	37.6	70	159.7	58.1	30	216.1	78.7	90	272.5	99.2
51	47.9	17.4	111	104.3	38.0	171	160.7	58.5	231	217.1	79.0	291	273.5	99.5
52	48.9	17.8	12	105.2	38.3	72	161.6	58.8	32	218.0	79.3	92	274.4	99.9
53	49.8	18.1	13	106.2	38.6	73	162.6	59.2	33	218.9	79.7	93	275.3	100.2
54	50.7	18.5	14	107.1	39.0	74	163.5	59.5	34	219.9	80.0	94	276.3	100.6
55	51.7	18.8	15	108.1	39.3	75	164.4	59.9	35	220.8	80.4	95	277.2	100.9
56	52.6	19.2	16	109.0	39.7	76	165.4	60.2	36	221.8	80.7	96	278.1	101.2
57	53.6	19.5	17	109.9	40.0	77	166.3	60.5	37	222.7	81.1	97	279.1	101.6
58	54.5	19.8	18	110.9	40.4	78	167.3	60.9	38	223.6	81.4	98	280.0	101.9
59	55.4	20.2	19	111.8	40.7	79	168.2	61.2	39	224.6	81.7	99	281.0	102.3
60	56.4	20.5	20	112.8	41.0	80	169.1	61.6	40	225.5	82.1	300	281.9	102.6
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

70° (110°, 250°, 290°).

TABLE 2.

Difference of Latitude and Departure for 20° (160°, 200°, 340°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	282.9	103.0	361	339.2	123.5	421	395.6	144.0	481	452.0	164.5	541	508.4	185.0
02	283.8	103.3	62	340.2	123.8	22	396.6	144.3	82	453.0	164.8	42	509.3	185.4
03	284.7	103.6	63	341.1	124.2	23	397.5	144.7	83	453.9	165.2	43	510.3	185.7
04	285.7	104.0	64	342.1	124.5	24	398.4	145.0	84	454.8	165.5	44	511.2	186.0
05	286.6	104.3	65	343.0	124.8	25	399.4	145.4	85	455.8	165.9	45	512.1	186.4
06	287.6	104.7	66	343.9	125.2	26	400.3	145.7	86	456.7	166.3	46	513.1	186.8
07	288.5	105.0	67	344.9	125.5	27	401.3	146.1	87	457.7	166.6	47	514.0	187.1
08	289.4	105.4	68	345.8	125.9	28	402.2	146.4	88	458.6	166.9	48	515.0	187.4
09	290.4	105.7	69	346.8	126.2	29	403.1	146.7	89	459.5	167.3	49	515.9	187.8
10	291.3	106.0	70	347.7	126.6	30	404.1	147.1	90	460.5	167.7	50	516.8	188.2
311	292.3	106.4	371	348.6	126.9	431	405.0	147.4	491	461.4	168.0	551	517.8	188.5
12	293.2	106.7	72	349.6	127.2	32	406.0	147.8	92	462.4	168.3	52	518.7	188.8
13	294.1	107.1	73	350.5	127.6	33	406.9	148.1	93	463.3	168.6	53	519.7	189.1
14	295.1	107.4	74	351.5	127.9	34	407.8	148.4	94	464.2	168.9	54	520.6	189.4
15	296.0	107.7	75	352.4	128.3	35	408.8	148.8	95	465.2	169.3	55	521.5	189.8
16	297.0	108.1	76	353.3	128.6	36	409.7	149.1	96	466.1	169.6	56	522.5	190.2
17	297.9	108.4	77	354.3	129.0	37	410.7	149.5	97	467.0	170.0	57	523.4	190.5
18	298.8	108.8	78	355.2	129.3	38	411.6	149.8	98	468.0	170.3	58	524.4	190.8
19	299.8	109.1	79	356.2	129.6	39	412.5	150.2	99	468.9	170.7	59	525.3	191.2
20	300.7	109.5	80	357.1	130.0	40	413.5	150.5	500	469.9	171.0	60	526.2	191.6
321	301.6	109.8	381	358.0	130.3	441	414.4	150.8	501	470.8	171.3	561	527.2	191.9
22	302.6	110.1	82	359.0	130.7	42	415.4	151.2	02	471.7	171.7	62	528.1	192.2
23	303.5	110.5	83	359.9	131.0	43	416.3	151.5	03	472.7	172.0	63	529.0	192.5
24	304.5	110.8	84	360.8	131.3	44	417.2	151.9	04	473.6	172.4	64	530.0	192.9
25	305.4	111.2	85	361.8	131.7	45	418.2	152.2	05	474.5	172.7	65	530.9	193.2
26	306.3	111.5	86	362.7	132.0	46	419.1	152.5	06	475.4	173.0	66	531.8	193.6
27	307.3	111.8	87	363.7	132.4	47	420.0	152.9	07	476.4	173.4	67	532.8	193.9
28	308.2	112.2	88	364.6	132.7	48	421.0	153.2	08	477.3	173.7	68	533.7	194.2
29	309.2	112.5	89	365.5	133.1	49	421.9	153.6	09	478.3	174.1	69	534.7	194.6
30	310.1	112.9	90	366.5	133.4	50	422.9	153.9	10	479.2	174.4	70	535.6	195.0
331	311.0	113.2	391	367.4	133.7	451	423.8	154.3	511	480.2	174.8	571	536.6	195.3
32	312.0	113.6	92	368.4	134.1	52	424.7	154.6	12	481.1	175.1	72	537.5	195.6
33	312.9	113.9	93	369.3	134.4	53	425.7	154.9	13	482.1	175.4	73	538.5	195.9
34	313.9	114.2	94	370.2	134.8	54	426.6	155.3	14	483.0	175.8	74	539.4	196.3
35	314.8	114.6	95	371.2	135.1	55	427.6	155.6	15	484.0	176.1	75	540.3	196.6
36	315.7	114.9	96	372.1	135.4	56	428.5	156.0	16	484.9	176.5	76	541.3	197.0
37	316.7	115.3	97	373.1	135.8	57	429.4	156.3	17	485.8	176.8	77	542.2	197.3
38	317.6	115.6	98	374.0	136.1	58	430.4	156.7	18	486.8	177.2	78	543.2	197.7
39	318.6	116.0	99	374.9	136.5	59	431.3	157.0	19	487.7	177.5	79	544.1	198.0
40	319.5	116.3	400	375.9	136.8	60	432.3	157.4	20	488.7	177.9	80	545.0	198.4
341	320.4	116.6	401	376.8	137.2	461	433.2	157.7	521	489.6	178.2	581	546.0	198.7
42	321.4	117.0	02	377.8	137.5	62	434.1	158.0	22	490.5	178.5	82	546.9	199.0
43	322.3	117.3	03	378.7	137.8	63	435.1	158.4	23	491.5	178.9	83	547.9	199.4
44	323.3	117.7	04	379.6	138.2	64	436.0	158.7	24	492.4	179.2	84	548.8	199.8
45	324.2	118.0	05	380.6	138.5	65	437.0	159.0	25	493.4	179.6	85	549.8	200.1
46	325.1	118.4	06	381.5	138.9	66	437.9	159.4	26	494.3	179.9	86	550.7	200.4
47	326.1	118.7	07	382.5	139.2	67	438.8	159.7	27	495.3	180.2	87	551.7	200.8
48	327.0	119.0	08	383.4	139.6	68	439.8	160.1	28	496.2	180.6	88	552.6	201.2
49	328.0	119.4	09	384.3	139.9	69	440.7	160.4	29	497.1	181.0	89	553.5	201.5
50	328.9	119.7	10	385.3	140.2	70	441.7	160.8	30	498.1	181.3	90	554.4	201.8
351	329.8	120.1	411	386.2	140.6	471	442.6	161.1	531	499.0	181.6	591	555.4	202.1
52	330.8	120.4	12	387.2	140.9	72	443.5	161.4	32	499.9	181.9	92	556.3	202.4
53	331.7	120.7	13	388.1	141.3	73	444.5	161.8	33	500.9	182.3	93	557.3	202.8
54	332.7	121.1	14	389.0	141.6	74	445.4	162.1	34	501.8	182.6	94	558.2	203.2
55	333.6	121.4	15	390.0	141.9	75	446.4	162.5	35	502.7	183.0	95	559.1	203.5
56	334.5	121.8	16	390.9	142.3	76	447.3	162.8	36	503.7	183.3	96	560.0	203.8
57	335.5	122.1	17	391.9	142.6	77	448.2	163.2	37	504.6	183.7	97	561.0	204.2
58	336.4	122.5	18	392.8	143.0	78	449.2	163.5	38	505.5	184.0	98	561.9	204.6
59	337.4	122.8	19	393.7	143.3	79	450.1	163.8	39	506.5	184.3	99	562.9	204.9
60	338.3	123.1	20	394.7	143.7	80	451.1	164.2	40	507.4	184.7	600	563.8	205.2
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

70° (110°, 250°, 290°).

TABLE 2.

Difference of Latitude and Departure for 21° (159°, 201°, 339°).

Dist	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.9	0.4	61	56.9	21.9	121	113.0	43.4	181	169.0	64.9	241	225.0	86.4
2	1.9	0.7	62	57.9	22.2	22	113.9	43.7	82	169.9	65.2	42	225.9	86.7
3	2.8	1.1	63	58.8	22.6	23	114.8	44.1	83	170.8	65.6	43	226.9	87.1
4	3.7	1.4	64	59.7	22.9	24	115.8	44.4	84	171.8	65.9	44	227.8	87.4
5	4.7	1.8	65	60.7	23.3	25	116.7	44.8	85	172.7	66.3	45	228.7	87.8
6	5.6	2.2	66	61.6	23.7	26	117.6	45.2	86	173.6	66.7	46	229.7	88.2
7	6.5	2.5	67	62.5	24.0	27	118.6	45.5	87	174.6	67.0	47	230.6	88.5
8	7.5	2.9	68	63.5	24.4	28	119.5	45.9	88	175.5	67.4	48	231.5	88.9
9	8.4	3.2	69	64.4	24.7	29	120.4	46.2	89	176.4	67.7	49	232.5	89.2
10	9.3	3.6	70	65.4	25.1	30	121.4	46.6	90	177.4	68.1	50	233.4	89.6
11	10.3	3.9	71	66.3	25.4	131	122.3	46.9	191	178.3	68.4	251	234.3	90.0
12	11.2	4.3	72	67.2	25.8	32	123.2	47.3	92	179.2	68.8	52	235.3	90.3
13	12.1	4.7	73	68.2	26.2	33	124.2	47.7	93	180.2	69.2	53	236.2	90.7
14	13.1	5.0	74	69.1	26.5	34	125.1	48.0	94	181.1	69.5	54	237.1	91.0
15	14.0	5.4	75	70.0	26.9	35	126.0	48.4	95	182.0	69.9	55	238.1	91.4
16	14.9	5.7	76	71.0	27.2	36	127.0	48.7	96	183.0	70.2	56	239.0	91.7
17	15.9	6.1	77	71.9	27.6	37	127.9	49.1	97	183.9	70.6	57	239.9	92.1
18	16.8	6.5	78	72.8	28.0	38	128.8	49.5	98	184.8	71.0	58	240.9	92.5
19	17.7	6.8	79	73.8	28.3	39	129.8	49.8	99	185.8	71.3	59	241.8	92.8
20	18.7	7.2	80	74.7	28.7	40	130.7	50.2	200	186.7	71.7	60	242.7	93.2
21	19.6	7.5	81	75.6	29.0	141	131.6	50.5	201	187.6	72.0	261	243.7	93.5
22	20.5	7.9	82	76.6	29.4	42	132.6	50.9	02	188.6	72.4	62	244.6	93.9
23	21.5	8.2	83	77.5	29.7	43	133.5	51.2	03	189.5	72.7	63	245.5	94.3
24	22.4	8.6	84	78.4	30.1	44	134.4	51.6	04	190.5	73.1	64	246.5	94.6
25	23.3	9.0	85	79.4	30.5	45	135.4	52.0	05	191.4	73.5	65	247.4	95.0
26	24.3	9.3	86	80.3	30.8	46	136.3	52.3	06	192.3	73.8	66	248.3	95.3
27	25.2	9.7	87	81.2	31.2	47	137.2	52.7	07	193.3	74.2	67	249.3	95.7
28	26.1	10.0	88	82.2	31.5	48	138.2	53.0	08	194.2	74.5	68	250.2	96.0
29	27.1	10.4	89	83.1	31.9	49	139.1	53.4	09	195.1	74.9	69	251.1	96.4
30	28.0	10.8	90	84.0	32.3	50	140.0	53.8	10	196.1	75.3	70	252.1	96.8
31	28.9	11.1	91	85.0	32.6	151	141.0	54.1	211	197.0	75.6	271	253.0	97.1
32	29.9	11.5	92	85.9	33.0	52	141.9	54.5	12	197.9	76.0	72	253.9	97.5
33	30.8	11.8	93	86.8	33.3	53	142.8	54.8	13	198.9	76.3	73	254.9	97.8
34	31.7	12.2	94	87.8	33.7	54	143.8	55.2	14	199.8	76.7	74	255.8	98.2
35	32.7	12.5	95	88.7	34.0	55	144.7	55.5	15	200.7	77.0	75	256.7	98.6
36	33.6	12.9	96	89.6	34.4	56	145.6	55.9	16	201.7	77.4	76	257.7	98.9
37	34.5	13.3	97	90.6	34.8	57	146.6	56.3	17	202.6	77.8	77	258.6	99.3
38	35.5	13.6	98	91.5	35.1	58	147.5	56.6	18	203.5	78.1	78	259.5	99.6
39	36.4	14.0	99	92.4	35.5	59	148.4	57.0	19	204.5	78.5	79	260.5	100.0
40	37.3	14.3	100	93.4	35.8	60	149.4	57.3	20	205.4	78.8	80	261.4	100.3
41	38.3	14.7	101	94.3	36.2	161	150.3	57.7	221	206.3	79.2	281	262.3	100.7
42	39.2	15.1	02	95.2	36.6	62	151.2	58.1	22	207.3	79.6	82	263.3	101.1
43	40.1	15.4	03	96.2	36.9	63	152.2	58.4	23	208.2	79.9	83	264.2	101.4
44	41.1	15.8	04	97.1	37.3	64	153.1	58.8	24	209.1	80.3	84	265.1	101.8
45	42.0	16.1	05	98.0	37.6	65	154.0	59.1	25	210.1	80.6	85	266.1	102.1
46	42.9	16.5	06	99.0	38.0	66	155.0	59.5	26	211.0	81.0	86	267.0	102.5
47	43.9	16.8	07	99.9	38.3	67	155.9	59.8	27	211.9	81.3	87	267.9	102.9
48	44.8	17.2	08	100.8	38.7	68	156.8	60.2	28	212.9	81.7	88	268.9	103.2
49	45.7	17.6	09	101.8	39.1	69	157.8	60.6	29	213.8	82.1	89	269.8	103.6
50	46.7	17.9	10	102.7	39.4	70	158.7	60.9	30	214.7	82.4	90	270.7	103.9
51	47.6	18.3	111	103.6	39.8	171	159.6	61.3	231	215.7	82.8	291	271.7	104.3
52	48.5	18.6	12	104.6	40.1	72	160.6	61.6	32	216.6	83.1	92	272.6	104.6
53	49.5	19.0	13	105.5	40.5	73	161.5	62.0	33	217.5	83.5	93	273.5	105.0
54	50.4	19.4	14	106.4	40.9	74	162.4	62.4	34	218.5	83.9	94	274.5	105.4
55	51.3	19.7	15	107.4	41.2	75	163.4	62.7	35	219.4	84.2	95	275.4	105.7
56	52.3	20.1	16	108.3	41.6	76	164.3	63.1	36	220.3	84.6	96	276.3	106.1
57	53.2	20.4	17	109.2	41.9	77	165.2	63.4	37	221.3	84.9	97	277.3	106.4
58	54.1	20.8	18	110.2	42.3	78	166.2	63.8	38	222.2	85.3	98	278.2	106.8
59	55.1	21.1	19	111.1	42.6	79	167.1	64.1	39	233.1	85.6	99	279.1	107.2
60	56.0	21.5	20	112.0	43.0	80	168.0	64.5	40	224.1	86.0	300	280.1	107.5
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

69° (111°, 249°, 291°).

TABLE 2.

Difference of Latitude and Departure for 21° (159°, 201°, 339°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	281.0	107.9	361	337.0	129.4	421	393.0	150.9	481	449.0	172.4	541	505.1	193.9
02	281.9	108.2	62	337.9	129.7	22	394.0	151.2	82	450.0	172.7	42	506.0	194.2
03	282.9	108.6	63	338.9	130.1	23	394.9	151.6	83	450.9	173.1	43	507.0	194.6
04	283.8	108.9	64	339.8	130.4	24	395.8	152.0	84	451.8	173.5	44	507.9	195.0
05	284.7	109.3	65	340.7	130.8	25	396.8	152.3	85	452.8	173.8	45	508.8	195.3
06	285.7	109.7	66	341.7	131.2	26	397.7	152.7	86	453.7	174.2	46	509.8	195.7
07	286.6	110.0	67	342.6	131.5	27	398.6	153.0	87	454.6	174.5	47	510.7	196.0
08	287.5	110.4	68	343.5	131.9	28	399.6	153.4	88	455.6	174.9	48	511.6	196.4
09	288.5	110.7	79	344.5	132.2	29	400.5	153.7	89	456.5	175.2	49	512.6	196.8
10	289.4	111.1	70	345.4	132.6	30	401.4	154.1	90	457.4	175.6	50	513.5	197.1
311	290.3	111.5	371	346.3	133.0	431	402.4	154.5	491	458.4	176.0	551	514.4	197.5
12	291.3	111.8	72	347.3	133.3	32	403.3	154.8	92	459.3	176.3	52	515.4	197.8
13	292.2	112.2	73	348.2	133.7	33	404.2	155.2	93	460.2	176.7	53	516.3	198.2
14	293.1	112.5	74	349.1	134.0	34	405.2	155.5	94	461.2	177.0	54	517.2	198.6
15	294.1	112.9	75	350.1	134.4	35	406.1	155.9	95	462.1	177.4	55	518.2	198.9
16	295.0	113.2	76	351.0	134.7	36	407.0	156.3	96	463.0	177.8	56	519.1	199.3
17	295.9	113.6	77	351.9	135.1	37	408.0	156.6	97	464.0	178.1	57	520.0	199.6
18	296.9	114.0	78	352.9	135.5	38	408.9	157.0	98	464.9	178.5	58	521.0	200.0
19	297.8	114.3	79	353.8	135.8	39	409.8	157.3	99	465.8	178.8	59	521.9	200.3
20	298.7	114.7	80	354.7	136.2	40	410.8	157.7	500	466.8	179.2	60	522.8	200.7
321	299.7	115.0	381	355.7	136.5	441	411.7	158.0	501	467.7	179.5	561	523.8	201.0
22	300.6	115.4	82	356.6	136.9	42	412.6	158.4	02	468.6	179.9	62	524.7	201.4
23	301.5	115.8	83	357.5	137.3	43	413.6	158.8	03	469.6	180.3	63	525.6	201.8
24	302.5	116.1	84	358.5	137.6	44	414.5	159.1	04	470.5	180.6	64	526.6	202.1
25	303.4	116.5	85	359.4	138.0	45	415.4	159.5	05	471.5	181.0	65	527.5	202.5
26	304.3	116.8	86	360.3	138.3	46	416.4	159.8	06	472.4	181.3	66	528.4	202.8
27	305.3	117.2	87	361.3	138.7	47	417.3	160.2	07	473.3	181.7	67	529.4	203.2
28	306.2	117.5	88	362.2	139.1	48	418.2	160.5	08	474.3	182.0	68	530.3	203.5
29	307.1	117.9	89	363.1	139.4	49	419.2	160.9	09	475.2	182.4	69	531.2	203.9
30	308.1	118.3	90	364.1	139.8	50	420.1	161.3	10	476.1	182.8	70	532.2	204.3
331	309.0	118.6	391	365.0	140.1	451	421.0	161.6	511	477.1	183.1	571	533.1	204.6
32	309.9	119.0	92	365.9	140.5	52	422.0	162.0	12	478.0	183.5	72	534.0	205.0
33	310.9	119.3	93	366.9	140.8	53	422.9	162.3	13	478.9	183.8	73	535.0	205.4
34	311.8	119.7	94	367.8	141.2	54	423.8	162.7	14	479.9	184.2	74	535.9	205.7
35	312.7	120.1	95	368.7	141.6	55	424.8	163.1	15	480.8	184.6	75	536.8	206.1
36	313.7	120.4	96	369.7	141.9	56	425.7	163.4	16	481.7	184.9	76	537.8	206.4
37	314.6	120.8	97	370.6	142.3	57	426.6	163.8	17	482.7	185.3	77	538.7	206.8
38	315.5	121.1	98	371.5	142.6	58	427.6	164.1	18	483.6	185.6	78	539.6	207.1
39	316.5	121.5	99	372.5	143.0	59	428.5	164.5	19	484.5	186.0	79	540.6	207.5
40	317.4	121.8	400	373.4	143.4	60	429.4	164.9	20	485.5	186.4	80	541.5	207.9
341	318.3	122.2	401	374.3	143.7	461	430.4	165.2	521	486.4	186.7	581	542.4	208.2
42	319.3	122.6	02	375.3	144.1	62	431.3	165.6	22	487.3	187.1	82	543.4	208.6
43	320.2	122.9	03	376.2	144.4	63	432.2	165.9	23	488.3	187.4	83	544.3	208.9
44	321.1	123.2	04	377.1	144.8	64	433.2	166.3	24	489.2	187.8	84	545.2	209.3
45	322.1	123.6	05	378.1	145.1	65	434.1	166.6	25	490.1	188.1	85	546.2	209.6
46	323.0	124.0	06	379.0	145.5	66	435.0	167.0	26	491.1	188.5	86	547.1	210.0
47	323.9	124.4	07	379.9	145.9	67	436.0	167.4	27	492.0	188.9	87	548.0	210.4
48	324.9	124.7	08	380.9	146.2	68	436.9	167.7	28	492.9	189.2	88	549.0	210.7
49	325.8	125.1	09	381.8	146.6	69	437.8	168.1	29	493.9	189.6	89	549.9	211.1
50	326.7	125.4	10	382.7	146.9	70	438.8	168.4	30	494.8	189.9	90	550.8	211.4
351	327.7	125.8	411	383.7	147.3	471	439.7	168.8	531	495.7	190.3	591	551.8	211.8
52	328.6	126.1	12	384.6	147.7	72	440.6	169.2	32	496.7	190.7	92	552.7	212.2
53	329.5	126.5	13	385.5	148.0	73	441.6	169.5	33	497.6	191.0	93	553.6	212.5
54	330.5	126.9	14	386.5	148.4	74	442.5	169.9	34	498.5	191.4	94	554.6	212.9
55	331.4	127.2	15	387.4	148.7	75	443.4	170.2	35	499.5	191.7	95	555.5	213.2
56	332.3	127.6	16	388.4	149.1	76	444.4	170.6	36	500.4	192.1	96	556.4	213.6
57	333.3	127.9	17	389.3	149.4	77	445.3	170.9	37	501.3	192.4	97	557.4	213.9
58	334.2	128.3	18	390.2	149.8	78	446.2	171.3	38	502.3	192.8	98	558.2	214.3
59	335.1	128.7	19	391.2	150.2	79	447.2	171.7	39	503.2	193.2	99	559.2	214.7
60	336.1	129.0	20	392.1	150.5	80	448.1	172.0	40	504.1	193.5	600	560.1	215.0
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

69° (111°, 249°, 291°).

TABLE 2.

Difference of Latitude and Departure for 22° (158°, 202, 338°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.9	0.4	61	56.6	22.9	121	112.2	45.3	181	167.8	67.8	241	223.5	90.3
2	1.9	0.7	62	57.5	23.2	22	113.1	45.7	82	168.7	68.2	42	224.4	90.7
3	2.8	1.1	63	58.4	23.6	23	114.0	46.1	83	169.7	68.6	43	225.3	91.0
4	3.7	1.5	64	59.3	24.0	24	115.0	46.5	84	170.6	68.9	44	226.2	91.4
5	4.6	1.9	65	60.3	24.3	25	115.9	46.8	85	171.5	69.3	45	227.2	91.8
6	5.6	2.2	66	61.2	24.7	26	116.8	47.2	86	172.5	69.7	46	228.1	92.2
7	6.5	2.6	67	62.1	25.1	27	117.8	47.6	87	173.4	70.1	47	229.0	92.5
8	7.4	3.0	68	63.0	25.5	28	118.7	47.9	88	174.3	70.4	48	229.9	92.9
9	8.3	3.4	69	64.0	25.8	29	119.6	48.3	89	175.2	70.8	49	230.9	93.3
10	9.3	3.7	70	64.9	26.2	30	120.5	48.7	90	176.2	71.2	50	231.8	93.7
11	10.2	4.1	71	65.8	26.6	131	121.5	49.1	191	177.1	71.5	251	232.7	94.0
12	11.1	4.5	72	66.8	27.0	32	122.4	49.4	92	178.0	71.9	52	233.7	94.4
13	12.1	4.9	73	67.7	27.3	33	123.3	49.8	93	178.9	72.3	53	234.6	94.8
14	13.0	5.2	74	68.6	27.7	34	124.2	50.2	94	179.9	72.7	54	235.5	95.2
15	13.9	5.6	75	69.5	28.1	35	125.2	50.6	95	180.8	73.0	55	236.4	95.5
16	14.8	6.0	76	70.5	28.5	36	126.1	50.9	96	181.7	73.4	56	237.4	95.9
17	15.8	6.4	77	71.4	28.8	37	127.0	51.3	97	182.7	73.8	57	238.3	96.3
18	16.7	6.7	78	72.3	29.2	38	128.0	51.7	98	183.6	74.2	58	239.2	96.6
19	17.6	7.1	79	73.2	29.6	39	128.9	52.1	99	184.5	74.5	59	240.1	97.0
20	18.5	7.5	80	74.2	30.0	40	129.8	52.4	200	185.4	74.9	60	241.1	97.4
21	19.5	7.9	81	75.1	30.3	141	130.7	52.8	201	186.4	75.3	261	242.0	97.8
22	20.4	8.2	82	76.0	30.7	42	131.7	53.2	02	187.3	75.7	62	242.9	98.1
23	21.3	8.6	83	77.0	31.1	43	132.6	53.6	03	188.2	76.0	63	243.8	98.5
24	22.3	9.0	84	77.9	31.5	44	133.5	53.9	04	189.1	76.4	64	244.8	98.9
25	23.2	9.4	85	78.8	31.8	45	134.4	54.3	05	190.1	76.8	65	245.7	99.3
26	24.1	9.7	86	79.7	32.2	46	135.4	54.7	06	191.0	77.2	66	246.6	99.6
27	25.0	10.1	87	80.7	32.6	47	136.3	55.1	07	191.9	77.5	67	247.6	100.0
28	26.0	10.5	88	81.6	33.0	48	137.2	55.4	08	192.9	77.9	68	248.5	100.4
29	26.9	10.9	89	82.5	33.3	49	138.2	55.8	09	193.8	78.3	69	249.4	100.8
30	27.8	11.2	90	83.4	33.7	50	139.1	56.2	10	194.7	78.7	70	250.3	101.1
31	28.7	11.6	91	84.4	34.1	151	140.0	56.6	211	195.6	79.0	271	251.3	101.5
32	29.7	12.0	92	85.3	34.5	52	140.9	56.9	12	196.6	79.4	72	252.2	101.9
33	30.6	12.4	93	86.2	34.8	53	141.9	57.3	13	197.5	79.8	73	253.1	102.3
34	31.5	12.7	94	87.2	35.2	54	142.8	57.7	14	198.4	80.2	74	254.0	102.6
35	32.5	13.1	95	88.1	35.6	55	143.7	58.1	15	199.3	80.5	75	255.0	103.0
36	33.4	13.5	96	89.0	36.0	56	144.6	58.4	16	200.3	80.9	76	255.9	103.4
37	34.3	13.9	97	89.9	36.3	57	145.6	58.8	17	201.2	81.3	77	256.8	103.8
38	35.2	14.2	98	90.9	36.7	58	146.5	59.2	18	202.1	81.7	78	257.8	104.1
39	36.2	14.6	99	91.8	37.1	59	147.4	59.6	19	203.1	82.0	79	258.7	104.5
40	37.1	15.0	100	92.7	37.5	60	148.3	59.9	20	204.0	82.4	80	259.6	104.9
41	38.0	15.4	101	93.6	37.8	161	149.3	60.3	221	204.9	82.8	281	260.5	105.3
42	38.9	15.7	02	94.6	38.2	62	150.2	60.7	22	205.8	83.2	82	261.5	105.6
43	39.9	16.1	03	95.5	38.6	63	151.1	61.1	23	206.8	83.5	83	262.4	106.0
44	40.8	16.5	04	96.4	39.0	64	152.1	61.4	24	207.7	83.9	84	263.3	106.4
45	41.7	16.9	05	97.4	39.3	65	153.0	61.8	25	208.6	84.3	85	264.2	106.8
46	42.7	17.2	06	98.3	39.7	66	153.9	62.2	26	209.5	84.7	86	265.2	107.1
47	43.6	17.6	07	99.2	40.1	67	154.8	62.6	27	210.5	85.0	87	266.1	107.5
48	44.5	18.0	08	100.1	40.5	68	155.8	62.9	28	211.4	85.4	88	267.0	107.9
49	45.4	18.4	09	101.1	40.8	69	156.7	63.3	29	212.3	85.8	89	268.0	108.3
50	46.4	18.7	10	102.0	41.2	70	157.6	63.7	30	213.3	86.2	90	268.9	108.6
51	47.3	19.1	111	102.9	41.6	171	158.5	64.1	231	214.2	86.5	291	269.8	109.0
52	48.2	19.5	12	103.8	42.0	72	159.5	64.4	32	215.1	86.9	92	270.7	109.4
53	49.1	19.9	13	104.8	42.3	73	160.4	64.8	33	216.0	87.3	93	271.7	109.8
54	50.1	20.2	14	105.7	42.7	74	161.3	65.2	34	217.0	87.7	94	272.6	110.1
55	51.0	20.6	15	106.6	43.1	75	162.3	65.6	35	217.9	88.0	95	273.5	110.5
56	51.9	21.0	16	107.6	43.5	76	163.2	65.9	36	218.8	88.4	96	274.4	110.9
57	52.8	21.4	17	108.5	43.8	77	164.1	66.3	37	219.7	88.8	97	275.4	111.3
58	53.8	21.7	18	109.4	44.2	78	165.0	66.7	38	220.7	89.2	98	276.3	111.6
59	54.7	22.1	19	110.3	44.6	79	166.0	67.1	39	221.6	89.5	99	277.2	112.0
60	55.6	22.5	20	111.3	45.0	80	166.9	67.4	40	222.5	89.9	300	278.2	112.4
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

68° (112°, 248°, 292°).

TABLE 2.

Difference of Latitude and Departure for 22° (158°, 202°, 338°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	279.1	112.7	361	334.7	135.2	421	390.3	157.7	481	446.0	180.2	541	501.6	202.7
02	280.0	113.1	62	335.6	135.6	22	391.3	158.1	82	446.9	180.6	42	502.5	203.1
03	280.9	113.5	63	336.6	136.0	23	392.2	158.4	83	447.8	180.9	43	503.4	203.5
04	281.9	113.9	64	337.5	136.3	24	393.1	158.8	84	448.8	181.3	44	504.4	203.8
05	282.8	114.2	65	338.4	136.7	25	394.1	159.2	85	449.7	181.7	45	505.3	204.2
06	283.7	114.6	66	339.3	137.1	26	395.0	159.6	86	450.6	182.1	46	506.2	204.6
07	284.6	115.0	67	340.3	137.5	27	395.9	159.9	87	451.6	182.4	47	507.2	205.0
08	285.6	115.4	68	341.2	137.8	28	396.8	160.3	88	452.5	182.8	48	508.1	205.3
09	286.5	115.7	69	342.1	138.2	29	397.8	160.7	89	453.4	183.2	49	509.0	205.7
10	287.4	116.1	70	343.1	138.6	30	398.7	161.1	90	454.3	183.6	50	510.0	206.1
311	288.4	116.5	371	344.0	139.0	431	399.6	161.4	491	455.3	184.0	551	510.9	206.5
12	289.3	116.8	72	344.9	139.3	32	400.5	161.8	92	456.2	184.3	52	511.8	206.8
13	290.2	117.2	73	345.8	139.7	33	401.5	162.2	93	457.1	184.7	53	512.7	207.2
14	291.1	117.6	74	346.8	140.1	34	402.4	162.6	94	458.0	185.1	54	513.6	207.6
15	292.1	118.0	75	347.7	140.5	35	403.3	162.9	95	459.0	185.4	55	514.6	208.0
16	293.0	118.3	76	348.6	140.8	36	404.3	163.3	96	459.9	185.8	56	515.5	208.3
17	293.9	118.7	77	349.5	141.2	37	405.2	163.7	97	460.8	186.2	57	516.4	208.7
18	294.8	119.1	78	350.5	141.6	38	406.1	164.1	98	461.8	186.6	58	517.4	209.1
19	295.8	119.5	79	351.4	141.9	39	407.0	164.4	99	462.7	186.9	59	518.3	209.4
20	296.7	119.8	80	352.3	142.3	40	408.0	164.8	500	463.6	187.3	60	519.2	209.8
321	297.6	120.2	381	353.3	142.7	441	408.9	165.2	501	464.5	187.7	561	520.1	210.2
22	298.6	120.6	82	354.2	143.1	42	409.8	165.5	02	465.4	188.0	62	521.0	210.5
23	299.5	121.0	83	355.1	143.4	43	410.7	165.9	03	466.4	188.4	63	522.0	210.9
24	300.4	121.3	84	356.0	143.8	44	411.7	166.3	04	467.3	188.8	64	522.9	211.3
25	301.3	121.7	85	357.0	144.2	45	412.6	166.7	05	468.2	189.2	65	523.8	211.7
26	302.3	122.1	86	357.9	144.6	46	413.5	167.0	06	469.2	189.5	66	524.8	212.0
27	303.2	122.5	87	358.8	144.9	47	414.5	167.4	07	470.1	189.9	67	525.7	212.4
28	304.1	122.8	88	359.7	145.3	48	415.4	167.8	08	471.0	190.3	68	526.6	212.8
29	305.0	123.2	89	360.7	145.7	49	416.3	168.2	09	471.9	190.7	69	527.5	213.2
30	306.0	123.6	90	361.6	146.1	50	417.2	168.5	10	472.9	191.1	70	528.5	213.5
331	306.9	124.0	391	362.5	146.4	451	418.2	168.9	511	473.8	191.4	571	529.4	213.9
32	307.8	124.3	92	363.5	146.8	52	419.1	169.3	12	474.7	191.8	72	530.3	214.3
33	308.8	124.7	93	364.4	147.2	53	420.0	169.7	13	475.6	192.2	73	531.2	214.7
34	309.7	125.1	94	365.3	147.6	54	420.9	170.0	14	476.6	192.5	74	532.2	215.0
35	310.6	125.5	95	366.2	147.9	55	421.9	170.4	15	477.5	192.9	75	533.1	215.4
36	311.5	125.8	96	367.2	148.3	56	422.8	170.8	16	478.4	193.3	76	534.0	215.8
37	312.5	126.2	97	368.1	148.7	57	423.7	171.2	17	479.3	193.7	77	534.9	216.2
38	313.4	126.6	98	369.0	149.1	58	424.6	171.5	18	480.3	194.0	78	535.9	216.5
39	314.3	127.0	99	369.9	149.4	59	425.6	171.9	19	481.2	194.4	79	536.8	216.9
40	315.2	127.3	400	370.9	149.8	60	426.5	172.3	20	482.1	194.8	80	537.7	217.3
341	316.2	127.7	401	371.8	150.2	461	427.4	172.7	521	483.0	195.2	581	538.6	217.7
42	317.1	128.1	02	372.7	150.6	62	428.4	173.0	22	484.0	195.5	82	539.6	218.0
43	318.0	128.5	03	373.7	150.9	63	429.3	173.4	23	484.9	195.9	83	540.5	218.4
44	319.0	128.8	04	374.6	151.3	64	430.2	173.8	24	485.8	196.3	84	541.4	218.8
45	319.9	129.2	05	375.5	151.7	65	431.1	174.2	25	486.7	196.7	85	542.4	219.2
46	320.8	129.6	06	376.4	152.1	66	432.1	174.5	26	487.7	197.0	86	543.3	219.5
47	321.7	130.0	07	377.4	152.4	67	433.0	174.9	27	488.6	197.4	87	544.2	219.9
48	322.7	130.3	08	378.3	152.8	68	433.9	175.3	28	489.5	197.8	88	545.1	220.3
49	323.6	130.7	09	379.2	153.2	69	434.8	175.7	29	490.4	198.2	89	546.1	220.7
50	324.5	131.1	10	380.1	153.6	70	435.8	176.0	30	491.4	198.5	90	547.0	221.0
351	325.4	131.5	411	381.1	153.9	471	436.7	176.4	531	492.3	198.9	591	547.9	221.4
52	326.4	131.8	12	382.0	154.3	72	437.6	176.8	32	493.2	199.3	92	548.9	221.8
53	327.3	132.2	13	382.9	154.7	73	438.6	177.2	33	494.2	199.7	93	549.8	222.2
54	328.2	132.6	14	383.9	155.1	74	439.5	177.5	34	495.1	200.0	94	550.7	222.5
55	329.2	133.0	15	384.8	155.4	75	440.4	177.9	35	496.0	200.4	95	551.7	222.9
56	330.1	133.3	16	385.7	155.8	76	441.3	178.3	36	496.9	200.8	96	552.6	223.3
57	331.0	133.7	17	386.6	156.2	77	442.3	178.7	37	497.9	201.2	97	553.5	223.7
58	332.0	134.1	18	387.6	156.6	78	443.2	179.0	38	498.8	201.5	98	554.4	224.0
59	332.9	134.5	19	388.5	156.9	79	444.1	179.4	39	499.7	201.9	99	555.4	224.4
60	333.8	134.8	20	389.4	157.3	80	445.0	179.8	40	500.7	202.3	600	556.3	224.8
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

68° (112°, 248°, 292°).

TABLE 2.

Difference of Latitude and Departure for 23° (157°, 203°, 337°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.9	0.4	61	56.2	23.8	121	111.4	47.3	181	166.6	70.7	241	221.8	94.2
2	1.8	0.8	62	57.1	24.2	22	112.3	47.7	82	167.5	71.1	42	222.8	94.6
3	2.8	1.2	63	58.0	24.6	23	113.2	48.1	83	168.5	71.5	43	223.7	94.9
4	3.7	1.6	64	58.9	25.0	24	114.1	48.5	84	169.4	71.9	44	224.6	95.3
5	4.6	2.0	65	59.8	25.4	25	115.1	48.8	85	170.3	72.3	45	225.5	95.7
6	5.5	2.3	66	60.8	25.8	26	116.0	49.2	86	171.2	72.7	46	226.4	96.1
7	6.4	2.7	67	61.7	26.2	27	116.9	49.6	87	172.1	73.1	47	227.4	96.5
8	7.4	3.1	68	62.6	26.6	28	117.8	50.0	88	173.1	73.5	48	228.3	96.9
9	8.3	3.5	69	63.5	27.0	29	118.7	50.4	89	174.0	73.8	49	229.2	97.3
10	9.2	3.9	70	64.4	27.4	30	119.7	50.8	90	174.9	74.2	50	230.1	97.7
11	10.1	4.3	71	65.4	27.7	131	120.6	51.2	191	175.8	74.6	251	231.0	98.1
12	11.0	4.7	72	66.3	28.1	32	121.5	51.6	92	176.7	75.0	52	232.0	98.5
13	12.0	5.1	73	67.2	28.5	33	122.4	52.0	93	177.7	75.4	53	232.9	98.9
14	12.9	5.5	74	68.1	28.9	34	123.3	52.4	94	178.6	75.8	54	233.8	99.2
15	13.8	5.9	75	69.0	29.3	35	124.3	52.7	95	179.5	76.2	55	234.7	99.6
16	14.7	6.3	76	70.0	29.7	36	125.2	53.1	96	180.4	76.6	56	235.6	100.0
17	15.6	6.6	77	70.9	30.1	37	126.1	53.5	97	181.3	77.0	57	236.6	100.4
18	16.6	7.0	78	71.8	30.5	38	127.0	53.9	98	182.3	77.4	58	237.5	100.8
19	17.5	7.4	79	72.7	30.9	39	128.0	54.3	99	183.2	77.8	59	238.4	101.2
20	18.4	7.8	80	73.6	31.3	40	128.9	54.7	200	184.1	78.1	60	239.3	101.6
21	19.3	8.2	81	74.6	31.6	141	129.8	55.1	201	185.0	78.5	261	240.3	102.0
22	20.3	8.6	82	75.5	32.0	42	130.7	55.5	02	185.9	78.9	62	241.2	102.4
23	21.2	9.0	83	76.4	32.4	43	131.6	55.9	03	186.9	79.3	63	242.1	102.8
24	22.1	9.4	84	77.3	32.8	44	132.6	56.3	04	187.8	79.7	64	243.0	103.2
25	23.0	9.8	85	78.2	33.2	45	133.5	56.7	05	188.7	80.1	65	243.9	103.5
26	23.9	10.2	86	79.2	33.6	46	134.4	57.0	06	189.6	80.5	66	244.9	103.9
27	24.9	10.5	87	80.1	34.0	47	135.3	57.4	07	190.5	80.9	67	245.8	104.3
28	25.8	10.9	88	81.0	34.4	48	136.2	57.8	08	191.5	81.3	68	246.7	104.7
29	26.7	11.3	89	81.9	34.8	49	137.2	58.2	09	192.4	81.7	69	247.6	105.1
30	27.6	11.7	90	82.8	35.2	50	138.1	58.6	10	193.3	82.1	70	248.5	105.5
31	28.5	12.1	91	83.8	35.6	151	139.0	59.0	211	194.2	82.4	271	249.5	105.9
32	29.5	12.5	92	84.7	35.9	52	139.9	59.4	12	195.1	82.8	72	250.4	106.3
33	30.4	12.9	93	85.6	36.3	53	140.8	59.8	13	196.1	83.2	73	251.3	106.7
34	31.3	13.3	94	86.5	36.7	54	141.8	60.2	14	197.0	83.6	74	252.2	107.1
35	32.2	13.7	95	87.4	37.1	55	142.7	60.6	15	197.9	84.0	75	253.1	107.5
36	33.1	14.1	96	88.4	37.5	56	143.6	61.0	16	198.8	84.4	76	254.1	107.8
37	34.1	14.5	97	89.3	37.9	57	144.5	61.3	17	199.7	84.8	77	255.0	108.2
38	35.0	14.8	98	90.2	38.3	58	145.4	61.7	18	200.7	85.2	78	255.9	108.6
39	35.9	15.2	99	91.1	38.7	59	146.4	62.1	19	201.6	85.6	79	256.8	109.0
40	36.8	15.6	100	92.1	39.1	60	147.3	62.5	20	202.5	86.0	80	257.7	109.4
41	37.7	16.0	101	93.0	39.5	161	148.2	62.9	221	203.4	86.4	281	258.7	109.8
42	38.7	16.4	02	93.9	39.9	62	149.1	63.3	22	204.4	86.7	82	259.6	110.2
43	39.6	16.8	03	94.8	40.2	63	150.0	63.7	23	205.3	87.1	83	260.5	110.6
44	40.5	17.2	04	95.7	40.6	64	151.0	64.1	24	206.2	87.5	84	261.4	111.0
45	41.4	17.6	05	96.7	41.0	65	151.9	64.5	25	207.1	87.9	85	262.3	111.4
46	42.3	18.0	06	97.6	41.4	66	152.8	64.9	26	208.0	88.3	86	263.3	111.7
47	43.3	18.4	07	98.5	41.8	67	153.7	65.3	27	209.0	88.7	87	264.2	112.1
48	44.2	18.8	08	99.4	42.2	68	154.6	65.6	28	209.9	89.1	88	265.1	112.5
49	45.1	19.1	09	100.3	42.6	69	155.6	66.0	29	210.8	89.5	89	266.0	112.9
50	46.0	19.5	10	101.3	43.0	70	156.5	66.4	30	211.7	89.9	90	266.9	113.3
51	46.9	19.9	111	102.2	43.4	171	157.4	66.8	231	212.6	90.3	291	267.9	113.7
52	47.9	20.3	12	103.1	43.8	72	158.3	67.2	32	213.6	90.6	92	268.8	114.1
53	48.8	20.7	13	104.0	44.2	73	159.2	67.6	33	214.5	91.0	93	269.7	114.5
54	49.7	21.1	14	104.9	44.5	74	160.2	68.0	34	215.4	91.4	94	270.6	114.9
55	50.6	21.5	15	105.9	44.9	75	161.1	68.4	35	216.3	91.8	95	271.5	115.3
56	51.5	21.9	16	106.8	45.3	76	162.0	68.8	36	217.2	92.2	96	272.5	115.7
57	52.5	22.3	17	107.7	45.7	77	162.9	69.2	37	218.2	92.6	97	273.4	116.0
58	53.4	22.7	18	108.6	46.1	78	163.8	69.6	38	219.1	93.0	98	274.3	116.4
59	54.3	23.1	19	109.5	46.5	79	164.8	69.9	39	220.0	93.4	99	275.2	116.8
60	55.2	23.4	20	110.5	46.9	80	165.7	70.3	40	220.9	93.8	300	276.2	117.2
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

67° (113°, 247°, 293°).

TABLE 2.

Difference of Latitude and Departure for 23° (157°, 203°, 337°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	277.1	117.6	361	332.3	141.1	421	387.5	164.5	481	442.7	188.0	541	498.0	211.4
02	278.0	118.0	62	333.2	141.5	22	388.5	164.9	82	443.7	188.4	42	498.9	211.8
03	278.9	118.4	63	334.1	141.8	23	389.4	165.3	83	444.6	188.8	43	499.8	212.2
04	279.8	118.8	64	335.1	142.2	24	390.3	165.7	84	445.5	189.2	44	500.7	212.6
05	280.8	119.2	65	336.0	142.6	25	391.2	166.1	85	446.4	189.5	45	501.7	213.0
06	281.7	119.6	66	336.9	143.0	26	392.1	166.5	86	447.3	189.9	46	502.6	213.4
07	282.6	120.0	67	337.8	143.4	27	393.1	166.8	87	448.3	190.2	47	503.5	213.8
08	283.5	120.4	68	338.7	143.8	28	394.0	167.2	88	449.2	190.6	48	504.4	214.2
09	284.4	120.8	69	339.7	144.2	29	394.9	167.6	89	450.1	191.0	49	505.3	214.6
10	285.4	121.2	70	340.6	144.6	30	395.8	168.0	90	451.0	191.4	50	506.3	215.0
311	286.3	121.6	371	341.5	145.0	431	396.7	168.4	491	451.9	191.8	551	507.2	215.3
12	287.2	121.9	72	342.4	145.4	32	397.7	168.8	92	452.9	192.2	52	508.1	215.6
13	288.1	122.3	73	343.4	145.7	33	398.6	169.2	93	453.8	192.6	53	509.0	216.0
14	289.0	122.7	74	344.3	146.1	34	399.5	169.6	94	454.7	193.0	54	509.9	216.4
15	290.0	123.1	75	345.2	146.5	35	400.4	170.0	95	455.6	193.4	55	510.9	216.8
16	290.9	123.5	76	346.1	146.9	36	401.3	170.4	96	456.6	193.8	56	511.8	217.2
17	291.8	123.9	77	347.0	147.3	37	402.3	170.8	97	457.5	194.2	57	512.7	217.6
18	292.7	124.3	78	348.0	147.7	38	403.2	171.1	98	458.4	194.6	58	513.6	218.0
19	293.6	124.6	79	348.9	148.1	39	404.1	171.5	99	459.3	195.0	59	514.5	218.4
20	294.6	125.0	80	349.8	148.5	40	405.0	171.9	500	460.2	195.4	60	515.5	218.8
321	295.5	125.4	381	350.7	148.9	441	405.9	172.3	501	461.2	195.8	561	516.4	219.2
22	296.4	125.8	82	351.6	149.3	42	406.9	172.7	02	462.1	196.2	62	517.3	219.6
23	297.3	126.2	83	352.6	149.7	43	407.8	173.1	03	463.0	196.6	63	518.2	220.0
24	298.2	126.6	84	353.5	150.0	44	408.7	173.5	04	463.9	197.0	64	519.2	220.4
25	299.2	127.0	85	354.4	150.4	45	409.6	173.9	05	464.9	197.4	65	520.1	220.8
26	300.1	127.4	86	355.3	150.8	46	410.5	174.3	06	465.8	197.8	66	521.0	221.2
27	301.0	127.8	87	356.2	151.2	47	411.5	174.7	07	466.7	198.1	67	521.9	221.6
28	301.9	128.2	88	357.2	151.6	48	412.4	175.1	08	467.6	198.5	68	522.8	222.0
29	302.8	128.6	89	358.1	152.0	49	413.3	175.4	09	468.5	198.8	69	523.8	222.3
30	303.8	128.9	90	359.0	152.4	50	414.2	175.8	10	469.5	199.3	70	524.7	222.7
331	304.7	129.3	391	359.9	152.8	451	415.2	176.2	511	470.4	199.7	571	525.6	223.1
32	305.6	129.7	92	360.8	153.2	52	416.1	176.6	12	471.3	200.0	72	526.5	223.4
33	306.5	130.1	93	361.8	153.6	53	417.0	177.0	13	472.2	200.4	73	527.4	223.8
34	307.5	130.5	94	362.7	154.0	54	417.9	177.4	14	473.1	200.8	74	528.4	224.2
35	308.4	130.9	95	363.6	154.3	55	418.8	177.8	15	474.0	201.2	75	529.3	224.6
36	309.3	131.3	96	364.5	154.7	56	419.8	178.2	16	475.0	201.6	76	530.2	225.0
37	310.2	131.7	97	365.4	155.1	57	420.7	178.6	17	475.9	202.0	77	531.1	225.4
38	311.1	132.1	98	366.4	155.5	58	421.6	179.0	18	476.8	202.4	78	532.0	225.8
39	312.1	132.5	99	367.3	155.9	59	422.5	179.4	19	477.7	202.8	79	533.0	226.2
40	313.0	132.9	400	368.2	156.3	60	423.4	179.7	20	478.6	203.2	80	533.9	226.6
341	313.9	133.2	401	369.1	156.7	461	424.4	180.1	521	479.6	203.6	581	534.8	227.0
42	314.8	133.6	02	370.0	157.1	62	425.3	180.5	22	480.5	204.0	82	535.7	227.4
43	315.7	134.0	03	371.0	157.5	63	426.2	180.9	23	481.4	204.4	83	536.6	227.8
44	316.7	134.4	04	371.9	157.9	64	427.1	181.3	24	482.3	204.8	84	537.6	228.2
45	317.6	134.8	05	372.8	158.3	65	428.0	181.7	25	483.2	205.2	85	538.5	228.6
46	318.5	135.2	06	373.7	158.6	66	429.0	182.1	26	484.2	205.5	86	539.4	229.0
47	319.4	135.6	07	374.6	159.0	67	429.9	182.5	27	485.1	205.9	87	540.3	229.4
48	320.3	136.0	08	375.6	159.4	68	430.8	182.9	28	486.0	206.3	88	541.2	229.8
49	321.3	136.4	09	376.5	159.8	69	431.7	183.3	29	486.9	206.7	89	542.2	230.2
50	322.2	136.8	10	377.4	160.2	70	432.6	183.7	30	487.8	207.1	90	543.1	230.6
351	323.1	137.2	411	378.3	160.6	471	433.6	184.0	531	488.8	207.4	591	544.0	231.0
52	324.0	137.5	12	379.3	161.0	72	434.5	184.4	32	489.7	207.8	92	544.9	231.3
53	324.9	137.9	13	380.2	161.4	73	435.4	184.8	33	490.6	208.2	93	545.8	231.7
54	325.9	138.3	14	381.1	161.8	74	436.3	185.2	34	491.5	208.6	94	546.8	232.0
55	326.8	138.7	15	382.0	162.2	75	437.2	185.6	35	492.5	209.0	95	547.7	232.4
56	327.7	139.1	16	382.9	162.5	76	438.2	186.0	36	493.4	209.4	96	548.6	232.8
57	328.6	139.5	17	383.9	162.9	77	439.1	186.4	37	494.3	209.8	97	549.5	233.2
58	329.5	139.9	18	384.8	163.3	78	440.0	186.8	38	495.2	210.2	98	550.4	233.6
59	330.5	140.3	19	385.7	163.7	79	440.9	187.2	39	496.1	210.6	99	551.3	234.0
60	331.4	140.7	20	386.6	164.1	80	441.8	187.6	40	497.1	211.0	600	552.3	234.4
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

67°(113°, 247°, 293°).

TABLE 2.

Difference of Latitude and Departure for 24° (156°, 204°, 336°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.9	0.4	61	55.7	24.8	121	110.5	49.2	181	165.4	73.6	241	220.2	98.0
2	1.8	0.8	62	56.6	25.2	22	111.5	49.6	82	166.3	74.0	42	221.1	98.4
3	2.7	1.2	63	57.6	25.6	23	112.4	50.0	83	167.2	74.4	43	222.0	98.8
4	3.7	1.6	64	58.5	26.0	24	113.3	50.4	84	168.1	74.8	44	222.9	99.2
5	4.6	2.0	65	59.4	26.4	25	114.2	50.8	85	169.0	75.2	45	223.8	99.7
6	5.5	2.4	66	60.3	26.8	26	115.1	51.2	86	169.9	75.7	46	224.7	100.1
7	6.4	2.8	67	61.2	27.3	27	116.0	51.7	87	170.8	76.1	47	225.6	100.5
8	7.3	3.3	68	62.1	27.7	28	116.9	52.1	88	171.7	76.5	48	226.6	100.9
9	8.2	3.7	69	63.0	28.1	29	117.8	52.5	89	172.7	76.9	49	227.5	101.3
10	9.1	4.1	70	63.9	28.5	30	118.8	52.9	90	173.6	77.3	50	228.4	101.7
11	10.0	4.5	71	64.9	28.9	131	119.7	53.3	191	174.5	77.7	251	229.3	102.1
12	11.0	4.9	72	65.8	29.3	32	120.6	53.7	92	175.4	78.1	52	230.2	102.5
13	11.9	5.3	73	66.7	29.7	33	121.5	54.1	93	176.3	78.5	53	231.1	102.9
14	12.8	5.7	74	67.6	30.1	34	122.4	54.5	94	177.2	78.9	54	232.0	103.3
15	13.7	6.1	75	68.5	30.5	35	123.3	54.9	95	178.1	79.3	55	233.0	103.7
16	14.6	6.5	76	69.4	30.9	36	124.2	55.3	96	179.1	79.7	56	233.9	104.1
17	15.5	6.9	77	70.3	31.3	37	125.2	55.7	97	180.0	80.1	57	234.8	104.5
18	16.4	7.3	78	71.3	31.7	38	126.1	56.1	98	180.9	80.5	58	235.7	104.9
19	17.4	7.7	79	72.2	32.1	39	127.0	56.5	99	181.8	80.9	59	236.6	105.3
20	18.3	8.1	80	73.1	32.5	40	127.9	56.9	200	182.7	81.3	60	237.5	105.8
21	19.2	8.5	81	74.0	32.9	141	128.8	57.3	201	183.6	81.8	261	238.4	106.2
22	20.1	8.9	82	74.9	33.4	42	129.7	57.8	02	184.5	82.2	62	239.3	106.6
23	21.0	9.4	83	75.8	33.8	43	130.6	58.2	03	185.4	82.6	63	240.3	107.0
24	21.9	9.8	84	76.7	34.2	44	131.6	58.6	04	186.4	83.0	64	241.2	107.4
25	22.8	10.2	85	77.7	34.6	45	132.5	59.0	05	187.3	83.4	65	242.1	107.8
26	23.8	10.6	86	78.6	35.0	46	133.4	59.4	06	188.2	83.8	66	243.0	108.2
27	24.7	11.0	87	79.5	35.4	47	134.3	59.8	07	189.1	84.2	67	243.9	108.6
28	25.6	11.4	88	80.4	35.8	48	135.2	60.2	08	190.0	84.6	68	244.8	109.0
29	26.5	11.8	89	81.3	36.2	49	136.1	60.6	09	190.9	85.0	69	245.7	109.4
30	27.4	12.2	90	82.2	36.6	50	137.0	61.0	10	191.8	85.4	70	246.7	109.8
31	28.3	12.6	91	83.1	37.0	151	137.9	61.4	211	192.8	85.8	271	247.6	110.2
32	29.2	13.0	92	84.0	37.4	52	138.9	61.8	12	193.7	86.2	72	248.5	110.6
33	30.1	13.4	93	85.0	37.8	53	139.8	62.2	13	194.6	86.6	73	249.4	111.0
34	31.1	13.8	94	85.9	38.2	54	140.7	62.6	14	195.5	87.0	74	250.3	111.4
35	32.0	14.2	95	86.8	38.6	55	141.6	63.0	15	196.4	87.4	75	251.2	111.9
36	32.9	14.6	96	87.7	39.0	56	142.5	63.5	16	197.3	87.9	76	252.1	112.3
37	33.8	15.0	97	88.6	39.5	57	143.4	63.9	17	198.2	88.3	77	253.1	112.7
38	34.7	15.5	98	89.5	39.9	58	144.3	64.3	18	199.2	88.7	78	254.0	113.1
39	35.6	15.9	99	90.4	40.3	59	145.3	64.7	19	200.1	89.1	79	254.9	113.5
40	36.5	16.3	100	91.4	40.7	60	146.2	65.1	20	201.0	89.5	80	255.8	113.9
41	37.5	16.7	101	92.3	41.1	161	147.1	65.5	221	201.9	89.9	281	256.7	114.3
42	38.4	17.1	02	93.2	41.5	62	148.0	65.9	22	202.8	90.3	82	257.6	114.7
43	39.3	17.5	03	94.1	41.9	63	148.9	66.3	23	203.7	90.7	83	258.5	115.1
44	40.2	17.9	04	95.0	42.3	64	149.8	66.7	24	204.6	91.1	84	259.4	115.5
45	41.1	18.3	05	95.9	42.7	65	150.7	67.1	25	205.5	91.5	85	260.4	115.9
46	42.0	18.7	06	96.8	43.1	66	151.6	67.5	26	206.5	91.9	86	261.3	116.3
47	42.9	19.1	07	97.7	43.5	67	152.6	67.9	27	207.4	92.3	87	262.2	116.7
48	43.9	19.5	08	98.7	43.9	68	153.5	68.3	28	208.3	92.7	88	263.1	117.1
49	44.8	19.9	09	99.6	44.3	69	154.4	68.7	29	209.2	93.1	89	264.0	117.5
50	45.7	20.3	10	100.5	44.7	70	155.3	69.1	30	210.1	93.5	90	264.9	118.0
51	46.6	20.7	111	101.4	45.1	171	156.2	69.6	231	211.0	94.0	291	265.8	118.4
52	47.5	21.2	12	102.3	45.6	72	157.1	70.0	32	211.9	94.4	92	266.8	118.8
53	48.4	21.6	13	103.2	46.0	73	158.0	70.4	33	212.9	94.8	93	267.7	119.2
54	49.3	22.0	14	104.1	46.4	74	159.0	70.8	34	213.8	95.2	94	268.6	119.6
55	50.2	22.4	15	105.1	46.8	75	159.9	71.2	35	214.7	95.6	95	269.5	120.0
56	51.2	22.8	16	106.0	47.2	76	160.8	71.6	36	215.6	96.0	96	270.4	120.4
57	52.1	23.2	17	106.9	47.6	77	161.7	72.0	37	216.5	96.4	97	271.3	120.8
58	53.0	23.6	18	107.8	48.0	78	162.6	72.4	38	217.4	96.8	98	272.2	121.2
59	53.9	24.0	19	108.7	48.4	79	163.5	72.8	38	218.3	97.2	99	273.2	121.6
60	54.8	24.4	20	109.6	48.8	80	164.4	73.2	40	219.3	97.6	300	274.1	122.0
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

66° (114°, 246°, 294°).

TABLE 2.

Difference of Latitude and Departure for 24° (156°, 204°, 336°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	275.0	122.4	361	329.8	146.8	421	384.6	171.2	481	439.4	195.6	541	494.2	220.0
02	275.9	122.8	62	330.7	147.2	22	385.5	171.6	82	440.3	196.0	42	495.1	220.4
03	276.8	123.2	63	331.6	147.6	23	386.4	172.1	83	441.2	196.5	43	496.0	220.9
04	277.7	123.7	64	332.5	148.1	24	387.3	172.5	84	442.1	196.9	44	496.9	221.3
05	278.6	124.1	65	333.4	148.5	25	388.2	172.9	85	443.0	197.3	45	497.8	221.7
06	279.5	124.5	66	334.3	148.9	26	389.2	173.3	86	444.0	197.7	46	498.8	222.1
07	280.4	124.9	67	335.3	149.3	27	390.1	173.7	87	444.9	198.1	47	499.7	222.5
08	281.4	125.3	68	336.2	149.7	28	391.0	174.1	88	445.8	198.5	48	500.6	222.9
09	282.3	125.7	69	337.1	150.1	29	391.9	174.5	89	446.7	198.9	49	501.5	223.3
10	283.2	126.1	70	338.0	150.5	30	392.8	174.9	90	447.6	199.3	50	502.4	223.7
311	284.1	126.5	371	338.9	150.9	431	393.7	175.3	491	448.6	199.7	551	503.4	224.1
12	285.0	126.9	72	339.8	151.3	32	394.6	175.7	92	449.5	200.1	52	504.3	224.5
13	285.9	127.3	73	340.7	151.7	33	395.6	176.1	93	450.4	200.5	53	505.2	224.9
14	286.8	127.7	74	341.7	152.1	34	396.5	176.5	94	451.3	200.9	54	506.1	225.3
15	287.8	128.1	75	342.6	152.5	35	397.4	176.9	95	452.2	201.3	55	507.0	225.7
16	288.7	128.5	76	343.5	152.9	36	398.3	177.3	96	453.1	201.7	56	507.9	226.1
17	289.6	128.9	77	344.4	153.3	37	399.2	177.7	97	454.0	202.2	57	508.8	226.6
18	290.5	129.3	78	345.3	153.7	38	400.1	178.2	98	454.9	202.6	58	509.7	227.0
19	291.4	129.8	79	346.2	154.2	39	401.0	178.6	99	455.8	203.0	59	510.6	227.4
20	292.3	130.2	80	347.1	154.6	40	402.0	179.0	500	456.8	203.4	60	511.6	227.8
321	293.2	130.6	381	348.1	155.0	441	402.9	179.4	501	457.7	203.8	561	512.5	228.2
22	294.2	131.0	82	349.0	155.4	42	403.8	179.8	02	458.6	204.2	62	513.4	228.6
23	295.1	131.4	83	349.9	155.8	43	404.7	180.2	03	459.5	204.6	63	514.3	229.0
24	296.0	131.8	84	350.8	156.2	44	405.6	180.6	04	460.4	205.0	64	515.2	229.4
25	296.9	132.2	85	351.7	156.6	45	406.5	181.0	05	461.3	205.4	65	516.1	229.8
26	297.8	132.6	86	352.6	157.0	46	407.4	181.4	06	462.2	205.8	66	517.0	230.2
27	298.7	133.0	87	353.5	157.4	47	408.3	181.8	07	463.2	206.2	67	518.0	230.6
28	299.6	133.4	88	354.4	157.8	48	409.3	182.2	08	464.1	206.6	68	518.9	231.0
29	300.5	133.8	89	355.4	158.2	49	410.2	182.6	09	465.0	207.0	69	519.8	231.4
30	301.5	134.2	90	356.3	158.6	50	411.1	183.0	10	465.9	207.4	70	520.7	231.8
331	302.4	134.6	391	357.2	159.0	451	412.0	183.4	511	466.8	207.8	571	521.6	232.2
32	303.3	135.0	92	358.1	159.4	52	412.9	183.8	12	467.7	208.2	72	522.5	232.7
33	304.2	135.4	93	359.0	159.8	53	413.8	184.3	13	468.6	208.7	73	523.4	233.1
34	305.1	135.9	94	359.9	160.3	54	414.7	184.7	14	469.5	209.1	74	524.3	233.5
35	306.0	136.3	95	360.8	160.7	55	415.7	185.1	15	470.5	209.5	75	525.3	233.9
36	306.9	136.7	96	361.8	161.1	56	416.6	185.5	16	471.4	209.9	76	526.2	234.3
37	307.9	137.1	97	362.7	161.5	57	417.5	185.9	17	472.3	210.3	77	527.1	234.7
38	308.8	137.5	98	363.6	161.9	58	418.4	186.3	18	473.2	210.7	78	528.0	235.1
39	309.7	137.9	99	364.5	162.3	59	419.3	186.7	19	474.1	211.1	79	528.9	235.5
40	310.6	138.3	400	365.4	162.7	60	420.2	187.1	20	475.0	211.5	80	529.8	235.9
341	311.5	138.7	401	366.3	163.1	461	421.1	187.5	521	475.9	211.9	581	530.8	236.3
42	312.4	139.1	02	367.2	163.5	62	422.0	187.9	22	476.8	212.3	82	531.7	236.7
43	313.3	139.5	03	368.2	163.9	63	423.0	188.3	23	477.8	212.7	83	532.6	237.1
44	314.3	139.9	04	369.1	164.3	64	423.9	188.7	24	478.7	213.1	84	533.5	237.5
45	315.2	140.3	05	370.0	164.7	65	424.8	189.1	25	479.6	213.5	85	534.4	237.9
46	316.1	140.7	06	370.9	165.1	66	425.7	189.5	26	480.5	213.9	86	535.3	238.3
47	317.0	141.1	07	371.8	165.5	67	426.6	189.9	27	481.4	214.4	87	536.2	238.8
48	317.9	141.5	08	372.7	165.9	68	427.5	190.4	28	482.3	214.8	88	537.1	239.2
49	318.8	142.0	09	373.6	166.4	69	428.4	190.8	29	483.2	215.2	89	538.0	239.6
50	319.7	142.4	10	374.5	166.8	70	429.4	191.2	30	484.2	215.6	90	539.0	240.0
351	320.6	142.8	411	375.5	167.2	471	430.3	191.6	531	485.1	216.0	591	539.9	240.4
52	321.6	143.2	12	376.4	167.6	72	431.2	192.0	32	486.0	216.4	92	540.8	240.8
53	322.5	143.6	13	377.3	168.0	73	432.1	192.4	33	486.9	216.8	93	541.7	241.2
54	323.4	144.0	14	378.2	168.4	74	433.0	192.8	34	487.8	217.2	94	542.6	241.6
55	324.3	144.4	15	379.1	168.8	75	433.9	193.2	35	488.7	217.6	95	543.5	242.0
56	325.2	144.8	16	380.0	169.2	76	434.8	193.6	36	489.6	218.0	96	544.4	242.4
57	326.1	145.2	17	380.9	169.6	77	435.8	194.0	37	490.6	218.4	97	545.4	242.8
58	327.0	145.6	18	381.9	170.0	78	436.7	194.4	38	491.5	218.8	98	546.3	243.2
59	328.0	146.0	19	382.8	170.4	79	437.6	194.8	39	492.4	219.2	99	547.2	243.6
60	328.9	146.4	20	383.7	170.8	80	438.5	195.2	40	493.3	219.6	600	548.1	244.0
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

66° (114°, 246°, 294°).

TABLE 2.

Difference of Latitude and Departure for 25° (155°, 205°, 335°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.9	0.4	61	55.3	25.8	121	109.7	51.1	181	164.0	76.5	241	218.4	101.9
2	1.8	0.8	62	56.2	26.2	22	110.6	51.6	82	164.9	76.9	42	219.3	102.3
3	2.7	1.3	63	57.1	26.6	23	111.5	52.0	83	165.9	77.3	43	220.2	102.7
4	3.6	1.7	64	58.0	27.0	24	112.4	52.4	84	166.8	77.8	44	221.1	103.1
5	4.5	2.1	65	58.9	27.5	25	113.3	52.8	85	167.7	78.2	45	222.0	103.5
6	5.4	2.5	66	59.8	27.9	26	114.2	53.2	86	168.6	78.6	46	223.0	104.0
7	6.3	3.0	67	60.7	28.3	27	115.1	53.7	87	169.5	79.0	47	223.9	104.4
8	7.3	3.4	68	61.6	28.7	28	116.0	54.1	88	170.4	79.5	48	224.8	104.8
9	8.2	3.8	69	62.5	29.2	29	116.9	54.5	89	171.3	79.9	49	225.7	105.2
10	9.1	4.2	70	63.4	29.6	30	117.8	54.9	90	172.2	80.3	50	226.6	105.7
11	10.0	4.6	71	64.3	30.0	131	118.7	55.4	191	173.1	80.7	251	227.5	106.1
12	10.9	5.1	72	65.3	30.4	32	119.6	55.8	92	174.0	81.1	52	228.4	106.5
13	11.8	5.5	73	66.2	30.9	33	120.5	56.2	93	174.9	81.6	53	229.3	106.9
14	12.7	5.9	74	67.1	31.3	34	121.4	56.6	94	175.8	82.0	54	230.2	107.3
15	13.6	6.3	75	68.0	31.7	35	122.4	57.1	95	176.7	82.4	55	231.1	107.8
16	14.5	6.8	76	68.9	32.1	36	123.3	57.5	96	177.6	82.8	56	232.0	108.2
17	15.4	7.2	77	69.8	32.5	37	124.2	57.9	97	178.5	83.3	57	232.9	108.6
18	16.3	7.6	78	70.7	33.0	38	125.1	58.3	98	179.4	83.7	58	233.8	109.0
19	17.2	8.0	79	71.6	33.4	39	126.0	58.7	99	180.4	84.1	59	234.7	109.5
20	18.1	8.5	80	72.5	33.8	40	126.9	59.2	200	181.3	84.5	60	235.6	109.9
21	19.0	8.9	81	73.4	34.2	141	127.8	59.6	201	182.2	84.9	261	236.5	110.3
22	19.9	9.3	82	74.3	34.7	42	128.7	60.0	02	183.1	85.4	62	237.5	110.7
23	20.8	9.7	83	75.2	35.1	43	129.6	60.4	03	184.0	85.8	63	238.4	111.1
24	21.8	10.1	84	76.1	35.5	44	130.5	60.9	04	184.9	86.2	64	239.3	111.6
25	22.7	10.6	85	77.0	35.9	45	131.4	61.3	05	185.8	86.6	65	240.2	112.0
26	23.6	11.0	86	77.9	36.3	46	132.3	61.7	06	186.7	87.1	66	241.1	112.4
27	24.5	11.4	87	78.8	36.8	47	133.2	62.1	07	187.6	87.5	67	242.0	112.8
28	25.4	11.8	88	79.8	37.2	48	134.1	62.5	08	188.5	87.9	68	242.9	113.3
29	26.3	12.3	89	80.7	37.6	49	135.0	63.0	09	189.4	88.3	69	243.8	113.7
30	27.2	12.7	90	81.6	38.0	50	135.9	63.4	10	190.3	88.7	70	244.7	114.1
31	28.1	13.1	91	82.5	38.5	151	136.9	63.8	211	191.2	89.2	271	245.6	114.5
32	29.0	13.5	92	83.4	38.9	52	137.8	64.2	12	192.1	89.6	72	246.5	115.0
33	29.9	13.9	93	84.3	39.3	53	138.7	64.7	13	193.0	90.0	73	247.4	115.4
34	30.8	14.4	94	85.2	39.7	54	139.6	65.1	14	193.9	90.4	74	248.3	115.8
35	31.7	14.8	95	86.1	40.1	55	140.5	65.5	15	194.9	90.9	75	249.2	116.2
36	32.6	15.2	96	87.0	40.6	56	141.4	65.9	16	195.8	91.3	76	250.1	116.6
37	33.5	15.6	97	87.9	41.0	57	142.3	66.4	17	196.7	91.7	77	251.0	117.1
38	34.4	16.1	98	88.8	41.4	58	143.2	66.8	18	197.6	92.1	78	252.0	117.5
39	35.3	16.5	99	89.7	41.8	59	144.1	67.2	19	198.5	92.6	79	252.9	117.9
40	36.3	16.9	100	90.6	42.3	60	145.0	67.6	20	199.4	93.0	80	253.8	118.3
41	37.2	17.3	101	91.5	42.7	161	145.9	68.0	221	200.3	93.4	281	254.7	118.8
42	38.1	17.7	02	92.4	43.1	62	146.8	68.5	22	201.2	93.8	82	255.6	119.2
43	39.0	18.2	03	93.3	43.5	63	147.7	68.9	23	202.1	94.2	83	256.5	119.6
44	39.9	18.6	04	94.3	44.0	64	148.6	69.3	24	203.0	94.7	84	257.4	120.0
45	40.8	19.0	05	95.2	44.4	65	149.5	69.7	25	203.9	95.1	85	258.3	120.4
46	41.7	19.4	06	96.1	44.8	66	150.4	70.2	26	204.8	95.5	86	259.2	120.9
47	42.6	19.9	07	97.0	45.2	67	151.4	70.6	27	205.7	95.9	87	260.1	121.3
48	43.5	20.3	08	97.9	45.6	68	152.3	71.0	28	206.6	96.4	88	261.0	121.7
49	44.4	20.7	09	98.8	46.1	69	153.2	71.4	29	207.5	96.8	89	261.9	122.1
50	45.3	21.1	10	99.7	46.5	70	154.1	71.8	30	208.5	97.2	90	262.8	122.6
51	46.2	21.6	111	100.6	46.9	171	155.0	72.3	231	209.4	97.6	291	263.7	123.0
52	47.1	22.0	12	101.5	47.3	72	155.9	72.7	32	210.3	98.0	92	264.6	123.4
53	48.0	22.4	13	102.4	47.8	73	156.8	73.1	33	211.2	98.5	93	265.5	123.8
54	48.9	22.8	14	103.3	48.2	74	157.7	73.5	34	212.1	98.9	94	266.5	124.2
55	49.8	23.2	15	104.2	48.6	75	158.6	74.0	35	213.0	99.3	95	267.4	124.7
56	50.8	23.7	16	105.1	49.0	76	159.5	74.4	36	213.9	99.7	96	268.3	125.1
57	51.7	24.1	17	106.0	49.4	77	160.4	74.8	37	214.8	100.2	97	269.2	125.5
58	52.6	24.5	18	106.9	49.9	78	161.3	75.2	38	215.7	100.6	98	270.1	125.9
59	53.5	24.9	19	107.9	50.3	79	162.2	75.6	39	216.6	101.0	99	271.0	126.4
60	54.4	25.4	20	108.8	50.7	80	163.1	76.1	40	217.5	101.4	300	271.9	126.8
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

65° (115°, 245°, 295°).

TABLE 2.

Difference of Latitude and Departure for 25° (155°, 205°, 335°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	272.8	127.2	361	327.1	152.5	421	381.5	177.9	481	435.9	203.3	541	490.3	228.6
02	273.7	127.6	62	328.0	153.0	22	382.4	178.3	82	436.8	203.7	42	491.2	229.0
03.	274.6	128.0	63	329.0	153.4	23	383.3	178.7	83	437.7	204.1	43	492.1	229.4
04	275.5	128.4	64	329.9	153.8	24	384.2	179.2	84	438.6	204.5	44	493.0	229.9
05	276.4	128.9	65	330.8	154.2	25	385.1	179.6	85	439.5	204.9	45	493.9	230.3
06	277.3	129.3	66	331.7	154.6	26	386.0	180.0	86	440.4	205.4	46	494.8	230.7
07	278.2	129.7	67	332.6	155.1	27	387.0	180.4	87	441.3	205.8	47	495.7	231.1
08	279.1	130.1	68	333.5	155.5	28	387.9	180.9	88	442.2	206.2	48	496.6	231.6
09	280.0	130.6	69	334.4	155.9	29	388.8	181.3	89	443.1	206.6	49	497.5	232.0
10	280.9	131.0	70	335.3	156.3	30	389.7	181.7	90	444.0	207.1	50	498.4	232.4
311	281.8	131.4	371	336.2	156.8	431	390.6	182.1	491	444.9	207.5	551	499.3	232.8
12	282.7	131.8	72	337.1	157.2	32	391.5	182.5	92	445.9	207.9	52	500.2	233.2
13	283.6	132.2	73	338.0	157.6	33	392.4	183.0	93	446.8	208.3	53	501.1	233.7
14	284.5	132.7	74	338.9	158.0	34	393.3	183.4	94	447.7	208.7	54	502.0	234.1
15	285.4	133.1	75	339.8	158.5	35	394.2	183.8	95	448.6	209.1	55	503.0	234.5
16	286.4	133.5	76	340.7	158.9	36	395.1	184.2	96	449.5	209.6	56	503.9	235.0
17	287.3	133.9	77	341.6	159.3	37	396.0	184.7	97	450.4	210.0	57	504.8	235.4
18	288.2	134.4	78	342.5	159.7	38	396.9	185.1	98	451.3	210.4	58	505.7	235.8
19	289.1	134.8	79	343.5	160.1	39	397.8	185.5	99	452.2	210.9	59	506.6	236.2
20	290.0	135.2	80	344.4	160.6	40	398.7	185.9	500	453.1	211.3	60	507.5	236.6
321	290.9	135.6	381	345.3	161.0	441	399.6	186.3	501	454.0	211.7	561	508.4	237.1
22	291.8	136.1	82	346.2	161.4	42	400.6	186.8	02	454.9	212.1	62	509.3	237.5
23	292.7	136.5	83	347.1	161.8	43	401.5	187.2	03	455.8	212.5	63	510.2	237.9
24	293.6	136.9	84	348.0	162.3	44	402.4	187.6	04	456.7	213.0	64	511.1	238.3
25	294.5	137.3	85	348.9	162.7	45	403.3	188.0	05	457.7	213.4	65	512.0	238.7
26	295.4	137.7	86	349.8	163.1	46	404.2	188.5	06	458.6	213.8	66	512.9	239.2
27	296.3	138.2	87	350.7	163.5	47	405.1	188.9	07	459.5	214.2	67	513.8	239.6
28	297.2	138.6	88	351.6	163.9	48	406.0	189.3	08	460.4	214.7	68	514.8	240.1
29	298.1	139.0	89	352.5	164.4	49	406.9	189.7	09	461.3	215.1	69	515.7	240.5
30	299.0	139.4	90	353.4	164.8	50	407.8	190.1	10	462.2	215.5	70	516.6	240.9
331	300.0	139.9	391	354.3	165.2	451	408.7	190.6	511	463.1	215.9	571	517.5	241.3
32	300.9	140.3	92	355.2	165.6	52	409.6	191.0	12	464.0	216.4	72	518.4	241.7
33	301.8	140.7	93	356.1	166.1	53	410.5	191.4	13	464.9	216.8	73	519.3	242.1
34	302.7	141.1	94	357.0	166.5	54	411.4	191.8	14	465.8	217.2	74	520.2	242.6
35	303.6	141.5	95	358.0	166.9	55	412.3	192.3	15	466.7	217.7	75	521.1	243.0
36	304.5	142.0	96	358.9	167.3	56	413.2	192.7	16	467.6	218.1	76	522.0	243.4
37	305.4	142.4	97	359.8	167.7	57	414.1	193.1	17	468.5	218.5	77	522.9	243.8
38	306.3	142.8	98	360.7	168.2	58	415.1	193.5	18	469.4	218.9	78	523.8	244.3
39	307.2	143.2	99	361.6	168.6	59	416.0	194.0	19	470.3	219.3	79	524.7	244.7
40	308.1	143.7	400	362.5	169.0	60	416.9	194.4	20	471.2	219.8	80	525.6	245.1
341	309.0	144.1	401	363.4	169.4	461	417.8	194.8	521	472.2	220.2	581	526.5	245.5
42	309.9	144.5	02	364.3	169.9	62	418.7	195.2	22	473.1	220.6	82	527.4	246.0
43	310.8	144.9	03	365.2	170.3	63	419.6	195.6	23	474.0	221.0	83	528.3	246.4
44	311.7	145.4	04	366.1	170.7	64	420.5	196.1	24	474.9	221.4	84	529.3	246.8
45	312.6	145.8	05	367.0	171.1	65	421.4	196.5	25	475.8	221.9	85	530.2	247.2
46	313.5	146.2	06	367.9	171.6	66	422.3	196.9	26	476.7	222.3	86	531.1	247.7
47	314.5	146.6	07	368.8	172.0	67	423.2	197.3	27	477.6	222.7	87	532.0	248.1
48	315.4	147.0	08	369.7	172.4	68	424.1	197.8	28	478.5	223.2	88	532.9	248.5
49	316.3	147.5	09	370.6	172.8	69	425.0	198.2	29	479.4	223.6	89	533.8	248.9
50	317.2	147.9	10	371.5	173.2	70	425.9	198.6	30	480.3	224.0	90	534.7	249.4
351	318.1	148.3	411	372.5	173.7	471	426.8	199.0	531	481.2	224.4	591	535.6	249.8
52	319.0	148.7	12	373.4	174.1	72	427.7	199.4	32	482.1	224.8	92	536.5	250.2
53	319.9	149.2	13	374.3	174.5	73	428.6	199.9	33	483.0	225.3	93	537.4	250.6
54	320.8	149.6	14	375.2	174.9	74	429.6	200.3	34	483.9	225.7	94	538.3	251.1
55	321.7	150.0	15	376.1	175.4	75	430.5	200.7	35	484.8	226.1	95	539.2	251.5
56	322.6	150.4	16	377.0	175.8	76	431.4	201.1	36	485.7	226.5	96	540.1	251.9
57	323.5	150.8	17	377.9	176.2	77	432.3	201.6	37	486.7	226.9	97	541.0	252.3
58	324.4	151.3	18	378.8	176.6	78	433.2	202.0	38	487.6	227.4	98	541.9	252.7
59	325.3	151.7	19	379.7	177.0	79	434.1	202.4	39	488.5	227.8	99	542.8	253.1
60	326.2	152.1	20	380.6	177.5	80	435.0	202.8	40	489.4	228.2	600	543.8	253.6
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

65° (115°, 245°, 295°).

TABLE 2.

Difference of Latitude and Departure for 26° (154°, 206°, 334°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.9	0.4	61	54.8	26.7	121	108.8	53.0	181	162.7	79.3	241	216.6	105.6
2	1.8	0.9	62	55.7	27.2	22	109.7	53.5	82	163.6	79.8	42	217.5	106.1
3	2.7	1.3	63	56.6	27.6	23	110.6	53.9	83	164.5	80.2	43	218.4	106.5
4	3.6	1.8	64	57.5	28.1	24	111.5	54.4	84	165.4	80.7	44	219.3	107.0
5	4.5	2.2	65	58.4	28.5	25	112.3	54.8	85	166.3	81.1	45	220.2	107.4
6	5.4	2.6	66	59.3	28.9	26	113.2	55.2	86	167.2	81.5	46	221.1	107.8
7	6.3	3.1	67	60.2	29.4	27	114.1	55.7	87	168.1	82.0	47	222.0	108.3
8	7.2	3.5	68	61.1	29.8	28	115.0	56.1	88	169.0	82.4	48	222.9	108.7
9	8.1	3.9	69	62.0	30.2	29	115.9	56.5	89	169.9	82.9	49	223.8	109.2
10	9.0	4.4	70	62.9	30.7	30	116.8	57.0	90	170.8	83.3	50	224.7	109.6
11	9.9	4.8	71	63.8	31.1	131	117.7	57.4	191	171.7	83.7	251	225.6	110.0
12	10.8	5.3	72	64.7	31.6	32	118.6	57.9	92	172.6	84.2	52	226.5	110.5
13	11.7	5.7	73	65.6	32.0	33	119.5	58.3	93	173.5	84.6	53	227.4	110.9
14	12.6	6.1	74	66.5	32.4	34	120.4	58.7	94	174.4	85.0	54	228.3	111.3
15	13.5	6.6	75	67.4	32.9	35	121.3	59.2	95	175.3	85.5	55	229.2	111.8
16	14.4	7.0	76	68.3	33.3	36	122.2	59.6	96	176.2	85.9	56	230.1	112.2
17	15.3	7.5	77	69.2	33.8	37	123.1	60.1	97	177.1	86.4	57	231.0	112.7
18	16.2	7.9	78	70.1	34.2	38	124.0	60.5	98	178.0	86.8	58	231.9	113.1
19	17.1	8.3	79	71.0	34.6	39	124.9	60.9	99	178.9	87.2	59	232.8	113.5
20	18.0	8.8	80	71.9	35.1	40	125.8	61.4	200	179.8	87.7	60	233.7	114.0
21	18.9	9.2	81	72.8	35.5	141	126.7	61.8	201	180.7	88.1	261	234.6	114.4
22	19.8	9.6	82	73.7	35.9	42	127.6	62.2	02	181.6	88.6	62	235.5	114.9
23	20.7	10.1	83	74.6	36.4	43	128.5	62.7	03	182.5	89.0	63	236.4	115.3
24	21.6	10.5	84	75.5	36.8	44	129.4	63.1	04	183.4	89.4	64	237.3	115.7
25	22.5	11.0	85	76.4	37.3	45	130.3	63.6	05	184.3	89.9	65	238.2	116.2
26	23.4	11.4	86	77.3	37.7	46	131.2	64.0	06	185.2	90.3	66	239.1	116.6
27	24.3	11.8	87	78.2	38.1	47	132.1	64.4	07	186.1	90.7	67	240.0	117.0
28	25.2	12.3	88	79.1	38.6	48	133.0	64.9	08	186.9	91.2	68	240.9	117.5
29	26.1	12.7	89	80.0	39.0	49	133.9	65.3	09	187.8	91.6	69	241.8	117.9
30	27.0	13.2	90	80.9	39.5	50	134.8	65.8	10	188.7	92.1	70	242.7	118.4
31	27.9	13.6	91	81.8	39.9	151	135.7	66.2	211	189.6	92.5	271	243.6	118.8
32	28.8	14.0	92	82.7	40.3	52	136.6	66.6	12	190.5	92.9	72	244.5	119.2
33	29.7	14.5	93	83.6	40.8	53	137.5	67.1	13	191.4	93.4	73	245.4	119.7
34	30.6	14.9	94	84.5	41.2	54	138.4	67.5	14	192.3	93.8	74	246.3	120.1
35	31.5	15.3	95	85.4	41.6	55	139.3	67.9	15	193.2	94.2	75	247.2	120.6
36	32.4	15.8	96	86.3	42.1	56	140.2	68.4	16	194.1	94.7	76	248.1	121.0
37	33.3	16.2	97	87.2	42.5	57	141.1	68.8	17	195.0	95.1	77	249.0	121.4
38	34.2	16.7	98	88.1	43.0	58	142.0	69.3	18	195.9	95.6	78	249.9	121.9
39	35.1	17.1	99	89.0	43.4	59	142.9	69.7	19	196.8	96.0	79	250.8	122.3
40	36.0	17.5	100	89.9	43.8	60	143.8	70.1	20	197.7	96.4	80	251.7	122.7
41	36.9	18.0	101	90.8	44.3	161	144.7	70.6	221	198.6	96.9	281	252.6	123.2
42	37.7	18.4	02	91.7	44.7	62	145.6	71.0	22	199.5	97.3	82	253.5	123.6
43	38.6	18.8	03	92.6	45.2	63	146.5	71.5	23	200.4	97.8	83	254.4	124.1
44	39.5	19.3	04	93.5	45.6	64	147.4	71.9	24	201.3	98.2	84	255.3	124.5
45	40.4	19.7	05	94.4	46.0	65	148.3	72.3	25	202.2	98.6	85	256.2	124.9
46	41.3	20.2	06	95.3	46.5	66	149.2	72.8	26	203.1	99.1	86	257.1	125.4
47	42.2	20.6	07	96.2	46.9	67	150.1	73.2	27	204.0	99.5	87	258.0	125.8
48	43.1	21.0	08	97.1	47.3	68	151.0	73.6	28	204.9	99.9	88	258.9	126.3
49	44.0	21.5	09	98.0	47.8	69	151.9	74.1	29	205.8	100.4	89	259.8	126.7
50	44.9	21.9	10	98.9	48.2	70	152.8	74.5	30	206.7	100.8	90	260.7	127.1
51	45.8	22.4	111	99.8	48.7	171	153.7	75.0	231	207.6	101.3	291	261.5	127.6
52	46.7	22.8	12	100.7	49.1	72	154.6	75.4	32	208.5	101.7	92	262.4	128.0
53	47.6	23.2	13	101.6	49.5	73	155.5	75.8	33	209.4	102.1	93	263.3	128.4
54	48.5	23.7	14	102.5	50.0	74	156.4	76.3	34	210.3	102.6	94	264.2	128.9
55	49.4	24.1	15	103.4	50.4	75	157.3	76.7	35	211.2	103.0	95	265.1	129.3
56	50.3	24.5	16	104.3	50.9	76	158.2	77.2	36	212.1	103.5	96	266.0	129.8
57	51.2	25.0	17	105.2	51.3	77	159.1	77.6	37	213.0	103.9	97	266.9	130.2
58	52.1	25.4	18	106.1	51.7	78	160.0	78.0	38	213.9	104.3	98	267.8	130.6
59	53.0	25.9	19	107.0	52.2	79	160.9	78.5	39	214.8	104.8	99	268.7	131.1
60	53.9	26.3	20	107.9	52.6	80	161.8	78.9	40	215.7	105.2	300	269.6	131.5
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

64° (116°, 244°, 296°).

TABLE 2.

Difference of Latitude and Departure for 26° (154°, 206°, 334).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	270.5	132.0	361	324.5	158.3	421	378.4	184.6	481	432.3	210.9	541	486.2	237.2
02	271.4	132.4	62	325.4	158.7	22	379.3	185.0	82	433.2	211.3	42	487.1	237.6
03	272.3	132.8	63	326.3	159.1	23	380.2	185.4	83	434.1	211.7	43	488.0	238.0
04	273.2	133.3	64	327.2	159.6	24	381.1	185.9	84	435.0	212.2	44	488.9	238.5
05	274.1	133.7	65	328.1	160.0	25	382.0	186.3	85	435.9	212.6	45	489.8	238.9
06	275.0	134.1	66	329.0	160.4	26	382.9	186.7	86	436.8	213.0	46	490.7	239.3
07	275.9	134.6	67	329.9	160.9	27	383.8	187.2	87	437.7	213.5	47	491.6	239.8
08	276.8	135.0	68	330.8	161.3	28	384.7	187.6	88	438.6	213.9	48	492.5	240.2
09	277.7	135.5	69	331.7	161.8	29	385.6	188.1	89	439.5	214.4	49	493.4	240.7
10	278.6	135.9	70	332.6	162.2	30	386.5	188.5	90	440.4	214.8	50	494.3	241.1
311	279.5	136.3	371	333.5	162.6	431	387.4	188.9	491	441.3	215.2	551	495.2	241.5
12	280.4	136.8	72	334.4	163.1	32	388.3	189.4	92	442.2	215.7	52	496.1	242.0
13	281.3	137.2	73	335.3	163.5	33	389.2	189.8	93	443.1	216.1	53	497.0	242.4
14	282.2	137.7	74	336.2	164.0	34	390.1	190.3	94	444.0	216.6	54	497.9	242.9
15	283.1	138.1	75	337.1	164.4	35	391.0	190.7	95	444.9	217.0	55	498.8	243.3
16	284.0	138.5	76	338.0	164.8	36	391.9	191.1	96	445.8	217.4	56	499.7	243.7
17	284.9	139.0	77	338.9	165.3	37	392.8	191.6	97	446.7	217.9	57	500.6	244.2
18	285.8	139.4	78	339.8	165.7	38	393.7	192.0	98	447.6	218.3	58	501.5	244.6
19	286.7	139.8	79	340.7	166.2	39	394.6	192.4	99	448.5	218.7	59	502.4	245.0
20	287.6	140.3	80	341.5	166.6	40	395.5	192.9	500	449.4	219.2	60	503.3	245.5
321	288.5	140.7	381	342.4	167.0	441	396.4	193.3	501	450.3	219.6	561	504.2	245.9
22	289.4	141.2	82	343.3	167.5	42	397.3	193.8	02	451.2	220.1	62	505.1	246.4
23	290.3	141.6	83	344.2	167.9	43	398.2	194.2	03	452.1	220.5	63	506.0	246.8
24	291.2	142.0	84	345.1	168.3	44	399.1	194.7	04	453.0	221.0	64	506.9	247.3
25	292.1	142.5	85	346.0	168.8	45	400.0	195.1	05	453.9	221.4	65	507.8	247.7
26	293.0	142.9	86	346.9	169.2	46	400.9	195.5	06	454.8	221.8	66	508.7	248.1
27	293.9	143.4	87	347.8	169.7	47	401.8	196.0	07	455.7	222.3	67	509.6	248.6
28	294.8	143.8	88	348.7	170.1	48	402.7	196.4	08	456.6	222.7	68	510.5	249.0
29	295.7	144.2	89	349.6	170.5	49	403.6	196.8	09	457.5	223.1	69	511.4	249.4
30	296.6	144.7	90	350.5	171.0	50	404.5	197.3	10	458.4	223.6	70	512.3	249.9
331	297.5	145.1	391	351.4	171.4	451	405.4	197.7	511	459.3	224.0	571	513.2	250.3
32	298.4	145.6	92	352.3	171.8	52	406.3	198.1	12	460.2	224.4	72	514.1	250.8
33	299.3	146.0	93	353.2	172.3	53	407.2	198.6	13	461.1	224.9	73	515.0	251.2
34	300.2	146.4	94	354.1	172.7	54	408.1	199.0	14	462.0	225.3	74	515.9	251.6
35	301.1	146.9	95	355.0	173.2	55	409.0	199.5	15	462.9	225.8	75	516.8	252.1
36	302.0	147.3	96	355.9	173.6	56	409.9	199.9	16	463.8	226.2	76	517.7	252.5
37	302.9	147.7	97	356.8	174.0	57	410.8	200.3	17	464.7	226.6	77	518.6	252.9
38	303.8	148.2	98	357.7	174.5	58	411.7	200.8	18	465.6	227.1	78	519.5	253.4
39	304.7	148.6	99	358.6	174.9	59	412.6	201.2	19	466.5	227.5	79	520.4	253.8
40	305.6	149.0	400	359.5	175.4	60	413.5	201.7	20	467.4	228.0	80	521.3	254.3
341	306.5	149.5	401	360.4	175.8	461	414.4	202.1	521	468.3	228.4	581	522.2	254.7
42	307.4	149.9	02	361.3	176.2	62	415.2	202.5	22	469.2	228.8	82	523.1	255.1
43	308.3	150.4	03	362.2	176.7	63	416.1	203.0	23	470.1	229.3	83	524.0	255.6
44	309.2	150.8	04	363.1	177.1	64	417.0	203.4	24	471.0	229.7	84	524.9	256.0
45	310.1	151.2	05	364.0	177.5	65	417.9	203.8	25	471.9	230.1	85	525.8	256.4
46	311.0	151.7	06	364.9	178.0	66	418.8	204.3	26	472.8	230.6	86	526.7	256.9
47	311.9	152.1	07	365.8	178.4	67	419.7	204.7	27	473.7	231.0	87	527.6	257.3
48	312.8	152.6	08	366.7	178.9	68	420.6	205.2	28	474.6	231.5	88	528.5	257.8
49	313.7	153.0	09	367.6	179.3	69	421.5	205.6	29	475.5	231.9	89	529.4	258.2
50	314.6	153.4	10	368.5	179.7	70	422.4	206.0	30	476.4	232.3	90	530.3	258.6
351	315.5	153.9	411	369.4	180.2	471	423.3	206.5	531	477.3	232.8	591	531.2	259.1
52	316.4	154.3	12	370.3	180.6	72	424.2	206.9	32	478.2	233.2	92	532.1	259.5
53	317.3	154.7	13	371.2	181.1	73	425.1	207.3	33	479.1	233.6	93	533.0	259.9
54	318.2	155.2	14	372.1	181.5	74	426.0	207.8	34	480.0	234.1	94	533.9	260.4
55	319.1	155.6	15	373.0	181.9	75	426.9	208.2	35	480.9	234.5	95	534.8	260.8
56	320.0	156.1	16	373.9	182.4	76	427.8	208.7	36	481.8	235.0	96	535.7	261.3
57	320.9	156.5	17	374.8	182.8	77	428.7	209.1	37	482.7	235.4	97	536.6	261.7
58	321.8	156.9	18	375.7	183.2	78	429.6	209.5	38	483.6	235.8	98	537.5	262.1
59	322.7	157.4	19	376.6	183.7	79	430.5	210.0	39	484.5	236.3	90	538.4	262.6
60	323.6	157.8	20	377.5	184.1	80	431.4	210.4	40	485.3	236.7	600	539.3	263.0
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

64° (116°, 244°, 296°).

TABLE 2.

Difference of Latitude and Departure for 27° (153°, 207°, 333°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.9	0.5	61	54.4	27.7	121	107.8	54.9	181	161.3	82.2	241	214.7	109.4
2	1.8	0.9	62	55.2	28.1	22	108.7	55.4	82	162.2	82.6	42	215.6	109.9
3	2.7	1.4	63	56.1	28.6	23	109.6	55.8	83	163.1	83.1	43	216.5	110.3
4	3.6	1.8	64	57.0	29.1	24	110.5	56.3	84	163.9	83.5	44	217.4	110.8
5	4.5	2.3	65	57.9	29.5	25	111.4	56.7	85	164.8	84.0	45	218.3	111.2
6	5.3	2.7	66	58.8	30.0	26	112.3	57.2	86	165.7	84.4	46	219.2	111.7
7	6.2	3.2	67	59.7	30.4	27	113.2	57.7	87	166.6	84.9	47	220.1	112.1
8	7.1	3.6	68	60.6	30.9	28	114.0	58.1	88	167.5	85.4	48	221.0	112.6
9	8.0	4.1	69	61.5	31.3	29	114.9	58.6	89	168.4	85.8	49	221.9	113.0
10	8.9	4.5	70	62.4	31.8	30	115.8	59.0	90	169.3	86.3	50	222.8	113.5
11	9.8	5.0	71	63.3	32.2	131	116.7	59.5	191	170.2	86.7	251	223.6	114.0
12	10.7	5.4	72	64.2	32.7	32	117.6	59.9	92	171.1	87.2	52	224.5	114.4
13	11.6	5.9	73	65.0	33.1	33	118.5	60.4	93	172.0	87.6	53	225.4	114.9
14	12.5	6.4	74	65.9	33.6	34	119.4	60.8	94	172.9	88.1	54	226.3	115.3
15	13.4	6.8	75	66.8	34.0	35	120.3	61.3	95	173.7	88.5	55	227.2	115.8
16	14.3	7.3	76	67.7	34.5	36	121.2	61.7	96	174.6	89.0	56	228.1	116.2
17	15.1	7.7	77	68.6	35.0	37	122.1	62.2	97	175.5	89.4	57	229.0	116.7
18	16.0	8.2	78	69.5	35.4	38	123.0	62.7	98	176.4	89.9	58	229.9	117.1
19	16.9	8.6	79	70.4	35.9	39	123.8	63.1	99	177.3	90.3	59	230.8	117.6
20	17.8	9.1	80	71.3	36.3	40	124.7	63.6	200	178.2	90.8	60	231.7	118.0
21	18.7	9.5	81	72.2	36.8	141	125.6	64.0	201	179.1	91.3	261	232.6	118.5
22	19.6	10.0	82	73.1	37.2	42	126.5	64.5	02	180.0	91.7	62	233.4	118.9
23	20.5	10.4	83	74.0	37.7	43	127.4	64.9	03	180.9	92.2	63	234.3	119.4
24	21.4	10.9	84	74.8	38.1	44	128.3	65.4	04	181.8	92.6	64	235.2	119.9
25	22.3	11.3	85	75.7	38.6	45	129.2	65.8	05	182.7	93.1	65	236.1	120.3
26	23.2	11.8	86	76.6	39.0	46	130.1	66.3	06	183.5	93.5	66	237.0	120.8
27	24.1	12.3	87	77.5	39.5	47	131.0	66.7	07	184.4	94.0	67	237.9	121.2
28	24.9	12.7	88	78.4	40.0	48	131.9	67.2	08	185.3	94.4	68	238.8	121.7
29	25.8	13.2	89	79.3	40.4	49	132.8	67.6	09	186.2	94.9	69	239.7	122.1
30	26.7	13.6	90	80.2	40.9	50	133.7	68.1	10	187.1	95.3	70	240.6	122.6
31	27.6	14.1	91	81.1	41.3	151	134.5	68.6	211	188.0	95.8	271	241.5	123.0
32	28.5	14.5	92	82.0	41.8	52	135.4	69.0	12	188.9	96.2	72	242.4	123.5
33	29.4	15.0	93	82.9	42.2	53	136.3	69.5	13	189.8	96.7	73	243.2	123.9
34	30.3	15.4	94	83.8	42.7	54	137.2	69.9	14	190.7	97.2	74	244.1	124.4
35	31.2	15.9	95	84.6	43.1	55	138.1	70.4	15	191.6	97.6	75	245.0	124.8
36	32.1	16.3	96	85.5	43.6	56	139.0	70.8	16	192.5	98.1	76	245.9	125.3
37	33.0	16.8	97	86.4	44.0	57	139.9	71.3	17	193.3	98.5	77	246.8	125.8
38	33.9	17.3	98	87.3	44.5	58	140.8	71.7	18	194.2	99.0	78	247.7	126.2
39	34.7	17.7	99	88.2	44.9	59	141.7	72.2	19	195.1	99.4	79	248.6	126.7
40	35.6	18.2	100	89.1	45.4	60	142.6	72.6	20	196.0	99.9	80	249.5	127.1
41	36.5	18.6	101	90.0	45.9	161	143.5	73.1	221	196.9	100.3	281	250.4	127.6
42	37.4	19.1	02	90.9	46.3	62	144.3	73.5	22	197.8	100.8	82	251.3	128.0
43	38.3	19.5	03	91.8	46.8	63	145.2	74.0	23	198.7	101.2	83	252.2	128.5
44	39.2	20.0	04	92.7	47.2	64	146.1	74.5	24	199.6	101.7	84	253.0	128.9
45	40.1	20.4	05	93.6	47.7	65	147.0	74.9	25	200.5	102.1	85	253.9	129.4
46	41.0	20.9	06	94.4	48.1	66	147.9	75.4	26	201.4	102.6	86	254.8	129.8
47	41.9	21.3	07	95.3	48.6	67	148.8	75.8	27	202.3	103.1	87	255.7	130.3
48	42.8	21.8	08	96.2	49.0	68	149.7	76.3	28	203.1	103.5	88	256.6	130.7
49	43.7	22.2	09	97.1	49.5	69	150.6	76.7	29	204.0	104.0	89	257.5	131.2
50	44.6	22.7	10	98.0	49.9	70	151.5	77.2	30	204.9	104.4	90	258.4	131.7
51	45.4	23.2	111	98.9	50.4	171	152.4	77.6	231	205.8	104.9	291	259.3	132.1
52	46.3	23.6	12	99.8	50.8	72	153.3	78.1	32	206.7	105.3	92	260.2	132.6
53	47.2	24.1	13	100.7	51.3	73	154.1	78.5	33	207.6	105.8	93	261.1	133.0
54	48.1	24.5	14	101.6	51.8	74	155.0	79.0	34	208.5	106.2	94	262.0	133.5
55	49.0	25.0	15	102.5	52.2	75	155.9	79.4	35	209.4	106.7	95	262.8	133.9
56	49.9	25.4	16	103.4	52.7	76	156.8	79.9	36	210.3	107.1	96	263.7	134.4
57	50.8	25.9	17	104.2	53.1	77	157.7	80.4	37	211.2	107.6	97	264.6	134.8
58	51.7	26.3	18	105.1	53.6	78	158.6	80.8	38	212.1	108.0	98	265.5	135.3
59	52.6	26.8	19	106.0	54.0	79	159.5	81.3	39	213.0	108.5	99	266.4	135.7
60	53.5	27.2	20	106.9	54.5	80	160.4	81.7	40	213.8	109.0	300	267.3	136.2
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

63° (117°, 243°, 297°).

TABLE 2.

Difference of Latitude and Departure for 27° (153°, 207°, 333°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	268.2	136.7	361	321.7	163.9	421	375.1	191.1	481	428.6	218.3	541	482.0	245.6
02	269.1	137.1	62	322.5	164.4	22	376.0	191.6	82	429.4	218.8	42	482.9	246.1
03	270.0	137.6	63	323.4	164.8	23	376.9	192.0	83	430.3	219.2	43	483.8	246.5
04	270.9	138.0	64	324.3	165.3	24	377.8	192.5	84	431.2	219.7	44	484.7	247.0
05	271.8	138.5	65	325.2	165.7	25	378.7	193.0	85	432.1	220.1	45	485.6	247.4
06	272.7	138.9	66	326.1	166.2	26	379.6	193.4	86	433.0	220.6	46	486.4	247.9
07	273.5	139.4	67	327.0	166.6	27	380.5	193.9	87	433.9	221.1	47	487.3	248.4
08	274.4	139.8	68	327.9	167.1	28	381.4	194.3	88	434.8	221.5	48	488.2	248.8
09	275.3	140.3	69	328.8	167.5	29	382.2	194.8	89	435.7	222.0	49	489.1	249.2
10	276.2	140.7	70	329.7	168.0	30	383.1	195.2	90	436.6	222.4	50	490.0	249.7
311	277.1	141.2	371	330.6	168.4	431	384.0	195.7	491	437.5	222.9	551	490.9	250.1
12	278.0	141.7	72	331.5	168.9	32	384.9	196.1	92	438.3	223.3	52	491.8	250.6
13	278.9	142.1	73	332.3	169.3	33	385.8	196.6	93	439.2	223.8	53	492.7	251.0
14	279.8	142.6	74	333.2	169.8	34	386.7	197.0	94	440.1	224.2	54	493.6	251.5
15	280.7	143.0	75	334.1	170.3	35	387.6	197.5	95	441.0	224.7	55	494.5	252.0
16	281.6	143.5	76	335.0	170.7	36	388.5	197.9	96	441.9	225.2	56	495.4	252.4
17	282.5	143.9	77	335.9	171.2	37	389.4	198.4	97	442.8	225.6	57	496.3	252.9
18	283.3	144.4	78	336.8	171.6	38	390.3	198.9	98	443.7	226.1	58	497.2	253.3
19	284.2	144.8	79	337.7	172.1	39	391.2	199.3	99	444.6	226.5	59	498.1	253.8
20	285.1	145.3	80	338.6	172.5	40	392.0	199.8	500	445.5	227.0	60	499.0	254.2
321	286.0	145.7	381	339.5	173.0	441	392.9	200.2	501	446.4	227.5	561	499.8	254.7
22	286.9	146.2	82	340.4	173.4	42	393.8	200.7	02	447.3	227.9	62	500.7	255.1
23	287.8	146.6	83	341.3	173.9	43	394.7	201.1	03	448.2	228.4	63	501.6	255.6
24	288.7	147.1	84	342.1	174.3	44	395.6	201.6	04	449.0	228.8	64	502.5	256.0
25	289.6	147.6	85	343.0	174.8	45	396.5	202.0	05	449.9	229.3	65	503.4	256.5
26	290.5	148.0	86	343.9	175.2	46	397.4	202.5	06	450.8	229.8	66	504.3	257.0
27	291.4	148.5	87	344.8	175.7	47	398.3	202.9	07	451.7	230.2	67	505.2	257.4
28	292.3	148.9	88	345.7	176.2	48	399.2	203.4	08	452.6	230.6	68	506.1	257.9
29	293.2	149.4	89	346.6	176.6	49	400.1	203.8	09	453.5	231.0	69	507.0	258.3
30	294.0	149.8	90	347.5	177.1	50	401.0	204.3	10	454.4	231.5	70	507.9	258.8
331	294.9	150.3	391	348.4	177.5	451	401.8	204.7	511	455.3	231.9	571	508.7	259.2
32	295.8	150.7	92	349.3	178.0	52	402.7	205.2	12	456.2	232.4	72	509.6	259.7
33	296.7	151.2	93	350.2	178.4	53	403.6	205.7	13	457.1	232.9	73	510.5	260.1
34	297.6	151.6	94	351.1	178.9	54	404.5	206.1	14	458.0	233.3	74	511.4	260.6
35	298.5	152.1	95	352.0	179.3	55	405.4	206.6	15	458.8	233.8	75	512.3	261.1
36	299.4	152.5	96	352.8	179.8	56	406.3	207.0	16	459.7	234.2	76	513.2	261.5
37	300.3	153.0	97	353.7	180.2	57	407.2	207.5	17	460.6	234.7	77	514.1	262.0
38	301.2	153.5	98	354.6	180.7	58	408.1	207.9	18	461.5	235.2	78	515.0	262.4
39	302.1	153.9	99	355.5	181.2	59	409.0	208.4	19	462.4	235.7	79	515.9	262.9
40	302.9	154.4	400	356.4	181.6	60	409.9	208.8	20	463.3	236.1	80	516.8	263.4
341	303.8	154.8	401	357.3	182.1	461	410.8	209.3	521	464.2	236.6	581	517.7	263.8
42	304.7	155.3	02	358.2	182.5	62	411.6	209.8	22	465.1	237.0	82	518.5	264.3
43	305.6	155.7	03	359.1	183.0	63	412.5	210.2	23	466.0	237.5	83	519.4	264.7
44	306.5	156.2	04	360.0	183.4	64	413.4	210.7	24	466.9	237.9	84	520.3	265.2
45	307.4	156.6	05	360.9	183.9	65	414.3	211.1	25	467.8	238.4	85	521.2	265.6
46	308.3	157.1	06	361.8	184.3	66	415.2	211.6	26	468.7	238.8	86	522.1	266.0
47	309.2	157.5	07	362.6	184.8	67	416.1	212.0	27	469.5	239.3	87	523.0	266.5
48	310.1	158.0	08	363.5	185.2	68	417.0	212.5	28	470.4	239.7	88	523.9	267.0
49	311.0	158.5	09	364.4	185.7	69	417.9	212.9	29	471.3	240.2	89	524.8	267.4
50	311.9	158.9	10	365.3	186.1	70	418.8	213.4	30	472.2	240.6	90	525.7	267.9
351	312.7	159.4	411	366.2	186.6	471	419.7	213.8	531	473.1	241.1	591	526.6	268.3
52	313.6	159.8	12	367.1	187.1	72	420.6	214.3	32	474.0	241.5	92	527.5	268.8
53	314.5	160.3	13	368.0	187.5	73	421.4	214.7	33	474.9	242.0	93	528.4	269.2
54	315.4	160.7	14	368.9	188.0	74	422.3	215.2	34	475.8	242.4	94	529.3	269.7
55	316.3	161.2	15	369.8	188.4	75	423.2	215.7	35	476.7	242.9	95	530.1	270.1
56	317.2	161.6	16	370.7	188.9	76	424.1	216.1	36	477.6	243.4	96	531.0	270.6
57	318.1	162.1	17	371.6	189.3	77	425.0	216.6	37	478.4	243.8	97	531.9	271.1
58	319.0	162.5	18	372.4	189.8	78	425.9	217.0	38	479.3	244.3	98	532.8	271.5
59	319.9	163.0	19	373.3	190.2	79	426.8	217.5	39	480.2	244.7	99	533.7	272.0
60	320.8	163.4	20	374.2	190.7	80	427.7	217.9	40	481.1	245.2	600	534.6	272.4
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

63° (117°, 243°, 297°).

TABLE 2.

Difference of Latitude and Departure for 28° (152°, 208°, 332°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.9	0.5	61	53.9	28.6	121	106.8	56.8	181	159.8	85.0	241	212.8	113.1
2	1.8	0.9	62	54.7	29.1	22	107.7	57.3	82	160.7	85.4	42	213.7	113.6
3	2.6	1.4	63	55.6	29.6	23	108.6	57.7	83	161.6	85.9	43	214.6	114.1
4	3.5	1.9	64	56.5	30.0	24	109.5	58.2	84	162.5	86.4	44	215.4	114.6
5	4.4	2.3	65	57.4	30.5	25	110.4	58.7	85	163.3	86.9	45	216.3	115.0
6	5.3	2.8	66	58.3	31.0	26	111.3	59.2	86	164.2	87.3	46	217.2	115.5
7	6.2	3.3	67	59.2	31.5	27	112.1	59.6	87	165.1	87.8	47	218.1	116.0
8	7.1	3.8	68	60.0	31.9	28	113.0	60.1	88	166.0	88.3	48	219.0	116.4
9	7.9	4.2	69	60.9	32.4	29	113.9	60.6	89	166.9	88.7	49	219.9	116.9
10	8.8	4.7	70	61.8	32.9	30	114.8	61.0	90	167.8	89.2	50	220.7	117.4
11	9.7	5.2	71	62.7	33.3	131	115.7	61.5	191	168.6	89.7	251	221.6	117.8
12	10.6	5.6	72	63.6	33.8	32	116.5	62.0	92	169.5	90.1	52	222.5	118.3
13	11.5	6.1	73	64.5	34.3	33	117.4	62.4	93	170.4	90.6	53	223.4	118.8
14	12.4	6.6	74	65.3	34.7	34	118.3	62.9	94	171.3	91.1	54	224.3	119.2
15	13.2	7.0	75	66.2	35.2	35	119.2	63.4	95	172.2	91.5	55	225.2	119.7
16	14.1	7.5	76	67.1	35.7	36	120.1	63.8	96	173.1	92.0	56	226.0	120.2
17	15.0	8.0	77	68.0	36.1	37	121.0	64.3	97	173.9	92.5	57	226.9	120.7
18	15.9	8.5	78	68.9	36.6	38	121.8	64.8	98	174.8	93.0	58	227.8	121.1
19	16.8	8.9	79	69.8	37.1	39	122.7	65.3	99	175.7	93.4	59	228.7	121.6
20	17.7	9.4	80	70.6	37.6	40	123.6	65.7	200	176.6	93.9	60	229.6	122.1
21	18.5	9.9	81	71.5	38.0	141	124.5	66.2	201	177.5	94.4	261	230.4	122.5
22	19.4	10.3	82	72.4	38.5	42	125.4	66.7	02	178.4	94.8	62	231.3	123.0
23	20.3	10.8	83	73.3	39.0	43	126.3	67.1	03	179.2	95.3	63	232.2	123.5
24	21.2	11.3	84	74.2	39.4	44	127.1	67.6	04	180.1	95.8	64	233.1	123.9
25	22.1	11.7	85	75.1	39.9	45	128.0	68.1	05	181.0	96.2	65	234.0	124.4
26	23.0	12.2	86	75.9	40.4	46	128.9	68.5	06	181.9	96.7	66	234.9	124.9
27	23.8	12.7	87	76.8	40.8	47	129.8	69.0	07	182.8	97.2	67	235.7	125.3
28	24.7	13.1	88	77.7	41.3	48	130.7	69.5	08	183.7	97.7	68	236.6	125.8
29	25.6	13.6	89	78.6	41.8	49	131.6	70.0	09	184.5	98.1	69	237.5	126.3
30	26.5	14.1	90	79.5	42.3	50	132.4	70.4	10	185.4	98.6	70	238.4	126.8
31	27.4	14.6	91	80.3	42.7	151	133.3	70.9	211	186.3	99.1	271	239.3	127.2
32	28.3	15.0	92	81.2	43.2	52	134.2	71.4	12	187.2	99.5	72	240.2	127.7
33	29.1	15.5	93	82.1	43.7	53	135.1	71.8	13	188.1	100.0	73	241.0	128.2
34	30.0	16.0	94	83.0	44.1	54	136.0	72.3	14	189.0	100.5	74	241.9	128.6
35	30.9	16.4	95	83.9	44.6	55	136.9	72.8	15	189.8	100.9	75	242.8	129.1
36	31.8	16.9	96	84.8	45.1	56	137.7	73.2	16	190.7	101.4	76	243.7	129.6
37	32.7	17.4	97	85.6	45.5	57	138.6	73.7	17	191.6	101.9	77	244.6	130.0
38	33.6	17.8	98	86.5	46.0	58	139.5	74.2	18	192.5	102.3	78	245.5	130.5
39	34.4	18.3	99	87.4	46.5	59	140.4	74.6	19	193.4	102.8	79	246.3	131.0
40	35.3	18.8	100	88.3	46.9	60	141.3	75.1	20	194.2	103.3	80	247.2	131.5
41	36.2	19.2	101	89.2	47.4	161	142.2	75.6	221	195.1	103.8	281	248.1	131.9
42	37.1	19.7	02	90.1	47.9	62	143.0	76.1	22	196.0	104.2	82	249.0	132.4
43	38.0	20.2	03	90.9	48.4	63	143.9	76.5	23	196.9	104.7	83	249.9	132.9
44	38.8	20.7	04	91.8	48.8	64	144.8	77.0	24	197.8	105.2	84	250.8	133.3
45	39.7	21.1	05	92.7	49.3	65	145.7	77.5	25	198.7	105.6	85	251.6	133.8
46	40.6	21.6	06	93.6	49.8	66	146.6	77.9	26	199.5	106.1	86	252.5	134.3
47	41.5	22.1	07	94.5	50.2	67	147.5	78.4	27	200.4	106.6	87	253.4	134.7
48	42.4	22.5	08	95.4	50.7	68	148.3	78.9	28	201.3	107.0	88	254.3	135.2
49	43.3	23.0	09	96.2	51.2	69	149.2	79.3	29	202.2	107.5	89	255.2	135.7
50	44.1	23.5	10	97.1	51.6	70	150.1	79.8	30	203.1	108.0	90	256.1	136.1
51	45.0	23.9	111	98.0	52.1	171	151.0	80.3	231	204.0	108.4	291	256.9	136.6
52	45.9	24.4	12	98.9	52.6	72	151.9	80.7	32	204.8	108.9	92	257.8	137.1
53	46.8	24.9	13	99.8	53.1	73	152.7	81.2	33	205.7	109.4	93	258.7	137.6
54	47.7	25.4	14	100.7	53.5	74	153.6	81.7	34	206.6	109.9	94	259.6	138.0
55	48.6	25.8	15	101.5	54.0	75	154.5	82.2	35	207.5	110.3	95	260.5	138.5
56	49.4	26.3	16	102.4	54.5	76	155.4	82.6	36	208.4	110.8	96	261.4	139.0
57	50.3	26.8	17	103.3	54.9	77	156.3	83.1	37	209.3	111.3	97	262.2	139.4
58	51.2	27.2	18	104.2	55.4	78	157.2	83.6	38	210.1	111.7	98	263.1	139.9
59	52.1	27.7	19	105.1	55.9	79	158.0	84.0	39	211.0	112.2	99	264.0	140.4
60	53.0	28.2	20	106.0	56.3	80	158.9	84.5	40	211.9	112.7	300	264.9	140.8
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

62° (118°, 242°, 298°).

TABLE 2.

Difference of Latitude and Departure for 28° (152°, 208°, 332°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	265.7	141.3	361	318.7	169.5	421	371.7	197.7	481	424.7	225.8	541	477.7	254.0
02	266.6	141.8	62	319.6	170.0	22	372.6	198.1	82	425.6	226.3	42	478.6	254.5
03	267.5	142.3	63	320.5	170.4	23	373.5	198.6	83	426.5	226.8	43	479.4	255.0
04	268.4	142.7	64	321.4	170.9	24	374.3	199.1	84	427.4	227.3	44	480.3	255.5
05	269.3	143.2	65	322.2	171.4	25	375.2	199.5	85	428.3	227.7	45	481.1	255.9
06	270.2	143.7	66	323.1	171.8	26	376.1	200.0	86	429.2	228.2	46	482.0	256.4
07	271.0	144.1	67	324.0	172.3	27	377.0	200.5	87	430.1	228.6	47	482.9	256.9
08	271.9	144.6	68	324.9	172.8	28	377.9	200.9	88	430.9	229.1	48	483.8	257.3
09	272.8	145.1	69	325.8	173.2	29	378.8	201.4	89	431.8	229.6	49	484.7	257.8
10	273.7	145.5	70	326.7	173.7	30	379.6	201.9	90	432.6	230.0	50	485.6	258.2
311	274.6	146.0	371	327.5	174.2	431	380.5	202.3	491	433.5	230.5	551	486.5	258.7
12	275.5	146.5	72	328.4	174.6	32	381.4	202.8	92	434.4	231.0	52	487.4	259.1
13	276.3	146.9	73	329.3	175.1	33	382.3	203.3	93	435.3	231.4	53	488.3	259.6
14	277.2	147.4	74	330.2	175.6	34	383.2	203.8	94	436.2	231.9	54	489.2	260.1
15	278.1	147.9	75	331.1	176.1	35	384.1	204.2	95	437.1	232.4	55	490.1	260.6
16	279.0	148.4	76	332.0	176.5	36	384.9	204.7	96	437.9	232.9	56	490.9	261.0
17	279.9	148.8	77	332.8	177.0	37	385.8	205.2	97	438.8	233.4	57	491.8	261.5
18	280.7	149.3	78	333.7	177.5	38	386.7	205.6	98	439.7	233.8	58	492.7	262.0
19	281.6	149.8	79	334.6	177.9	39	387.6	206.1	99	440.6	234.3	59	493.5	262.5
20	282.5	150.2	80	335.5	178.4	40	388.5	206.6	500	441.5	234.7	60	494.4	262.9
321	283.4	150.7	381	336.4	178.9	441	389.4	207.0	501	442.3	235.2	561	495.3	263.4
22	284.3	151.2	82	337.3	179.3	42	390.2	207.5	02	443.2	235.6	62	496.2	263.8
23	285.2	151.6	83	338.1	179.8	43	391.1	208.0	03	444.1	236.1	63	497.1	264.3
24	286.0	152.1	84	339.0	180.3	44	392.0	208.4	04	445.0	236.6	64	498.0	264.7
25	286.9	152.6	85	339.9	180.8	45	392.9	208.9	05	445.9	237.1	65	498.9	265.2
26	287.8	153.1	86	340.8	181.2	46	393.8	209.4	06	446.8	237.5	66	499.8	265.7
27	288.7	153.5	87	341.7	181.7	47	394.6	209.9	07	447.6	238.0	67	500.7	266.2
28	289.6	154.0	88	342.6	182.2	48	395.5	210.3	08	448.5	238.5	68	501.6	266.6
29	290.5	154.5	89	343.4	182.6	49	396.4	210.8	09	449.4	239.0	69	502.4	267.1
30	291.3	154.9	90	344.3	183.1	50	397.3	211.3	10	450.3	239.4	70	503.3	267.6
331	292.2	155.4	391	345.2	183.6	451	398.2	211.7	511	451.2	239.9	571	504.2	268.0
32	293.1	155.9	92	346.1	184.0	52	399.1	212.2	12	452.1	240.4	72	505.1	268.5
33	294.0	156.3	93	347.0	184.5	53	399.9	212.7	13	452.9	240.8	73	505.9	269.0
34	294.9	156.8	94	347.9	185.0	54	400.8	213.1	14	453.8	241.3	74	506.8	269.4
35	295.8	157.3	95	348.7	185.4	55	401.7	213.6	15	454.7	241.8	75	507.7	269.9
36	296.6	157.7	96	349.6	185.9	56	402.6	214.1	16	455.6	242.2	76	508.6	270.4
37	297.5	158.2	97	350.5	186.4	57	403.5	214.6	17	456.4	242.7	77	509.4	270.9
38	298.4	158.7	98	351.4	186.9	58	404.4	215.0	18	457.3	243.2	78	510.3	271.3
39	299.3	159.2	99	352.3	187.3	59	405.2	215.5	19	458.2	243.7	79	511.2	271.8
40	300.2	159.6	400	353.1	187.8	60	406.1	216.0	20	459.1	244.1	80	512.1	272.3
341	301.0	160.1	401	354.0	188.3	461	407.0	216.4	521	460.0	244.6	581	513.0	272.7
42	301.9	160.6	02	354.9	188.7	62	407.9	216.9	22	460.9	245.0	82	513.9	273.2
43	302.8	161.0	03	355.8	189.2	63	408.8	217.4	23	461.8	245.5	83	514.8	273.7
44	303.7	161.5	04	356.7	189.7	64	409.7	217.8	24	462.7	246.0	84	515.7	274.2
45	304.6	162.0	05	357.6	190.1	65	410.5	218.3	25	463.5	246.5	85	516.5	274.7
46	305.5	162.4	06	358.4	190.6	66	411.4	218.8	26	464.4	246.9	86	517.4	275.1
47	306.4	162.9	07	359.3	191.1	67	412.3	219.2	27	465.3	247.4	87	518.3	275.5
48	307.2	163.4	08	360.2	191.5	68	413.2	219.7	28	466.2	247.9	88	519.2	276.0
49	308.1	163.8	09	361.1	192.0	69	414.1	220.2	29	467.1	248.3	89	520.1	276.5
50	309.0	164.3	10	362.0	192.5	70	415.0	220.7	30	468.0	248.8	90	521.0	277.0
351	309.9	164.8	411	362.9	193.0	471	415.8	221.1	531	468.9	249.3	591	521.8	277.4
52	310.8	165.3	12	363.7	193.4	72	416.7	221.6	32	469.8	249.8	92	522.6	277.9
53	311.7	165.7	13	364.6	193.9	73	417.6	222.1	33	470.7	250.2	93	523.5	278.4
54	312.5	166.2	14	365.5	194.4	74	418.5	222.5	34	471.5	250.7	94	524.4	278.8
55	313.4	166.7	15	366.4	194.8	75	419.4	223.0	35	472.4	251.1	95	525.3	279.3
56	314.3	167.1	16	367.3	195.3	76	420.3	223.5	36	473.3	251.6	96	526.2	279.8
57	315.2	167.6	17	368.2	195.8	77	421.1	223.9	37	474.2	252.1	97	527.1	280.3
58	316.1	168.1	18	369.0	196.2	78	422.0	224.4	38	475.1	252.6	98	528.0	280.8
59	316.9	168.5	19	369.9	196.7	79	422.9	224.9	39	476.0	253.1	99	528.9	281.3
60	317.8	169.0	20	370.8	197.2	80	423.8	225.3	40	476.8	253.6	600	529.8	281.7
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

62° (118°, 242°, 298°).

TABLE 2.

Difference of Latitude and Departure for 29° (151°, 209°, 331°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.9	0.5	61	53.4	29.6	121	105.8	58.7	181	158.3	87.8	241	210.8	116.8
2	1.7	1.0	62	54.2	30.1	22	106.7	59.1	82	159.2	88.2	42	211.7	117.3
3	2.6	1.5	63	55.1	30.5	23	107.6	59.6	83	160.1	88.7	43	212.5	117.8
4	3.5	1.9	64	56.0	31.0	24	108.5	60.1	84	160.9	89.2	44	213.4	118.3
5	4.4	2.4	65	56.9	31.5	25	109.3	60.6	85	161.8	89.7	45	214.3	118.8
6	5.2	2.9	66	57.7	32.0	26	110.2	61.1	86	162.7	90.2	46	215.2	119.3
7	6.1	3.4	67	58.6	32.5	27	111.1	61.6	87	163.6	90.7	47	216.0	119.7
8	7.0	3.9	68	59.5	33.0	28	112.0	62.1	88	164.4	91.1	48	216.9	120.2
9	7.9	4.4	69	60.3	33.5	29	112.8	62.5	89	165.3	91.6	49	217.8	120.7
10	8.7	4.8	70	61.2	33.9	30	113.7	63.0	90	166.2	92.1	50	218.7	121.2
11	9.6	5.3	71	62.1	34.4	131	114.6	63.5	191	167.1	92.6	251	219.5	121.7
12	10.5	5.8	72	63.0	34.9	32	115.4	64.0	92	167.9	93.1	52	220.4	122.2
13	11.4	6.3	73	63.8	35.4	33	116.3	64.5	93	168.8	93.6	53	221.3	122.7
14	12.2	6.8	74	64.7	35.9	34	117.2	65.0	94	169.7	94.1	54	222.2	123.1
15	13.1	7.3	75	65.6	36.4	35	118.1	65.4	95	170.6	94.5	55	223.0	123.6
16	14.0	7.8	76	66.5	36.8	36	118.9	65.9	96	171.4	95.0	56	223.9	124.1
17	14.9	8.2	77	67.3	37.3	37	119.8	66.4	97	172.3	95.5	57	224.8	124.6
18	15.7	8.7	78	68.2	37.8	38	120.7	66.9	98	173.2	96.0	58	225.7	125.1
19	16.6	9.2	79	69.1	38.3	39	121.6	67.4	99	174.0	96.5	59	226.5	125.6
20	17.5	9.7	80	70.0	38.8	40	122.4	67.9	200	174.9	97.0	60	227.4	126.1
21	18.4	10.2	81	70.8	39.3	141	123.3	68.4	201	175.8	97.4	261	228.3	126.5
22	19.2	10.7	82	71.7	39.8	42	124.2	68.8	02	176.7	97.9	62	229.2	127.0
23	20.1	11.2	83	72.6	40.2	43	125.1	69.3	03	177.5	98.4	63	230.0	127.5
24	21.0	11.6	84	73.5	40.7	44	125.9	69.8	04	178.4	98.9	64	230.9	128.0
25	21.9	12.1	85	74.3	41.2	45	126.8	70.3	05	179.3	99.4	65	231.8	128.5
26	22.7	12.6	86	75.2	41.7	46	127.7	70.8	06	180.2	99.9	66	232.6	129.0
27	23.6	13.1	87	76.1	42.2	47	128.6	71.3	07	181.0	100.4	67	233.5	129.4
28	24.5	13.6	88	77.0	42.7	48	129.4	71.8	08	181.9	100.8	68	234.4	129.9
29	25.4	14.1	89	77.8	43.1	49	130.3	72.2	09	182.8	101.3	69	235.3	130.4
30	26.2	14.5	90	78.7	43.6	50	131.2	72.7	10	183.7	101.8	70	236.1	130.9
31	27.1	15.0	91	79.6	44.1	151	132.1	73.2	211	184.5	102.3	271	237.0	131.4
32	28.0	15.5	92	80.5	44.6	52	132.9	73.7	12	185.4	102.8	72	237.9	131.9
33	28.9	16.0	93	81.3	45.1	53	133.8	74.2	13	186.3	103.3	73	238.8	132.4
34	29.7	16.5	94	82.2	45.6	54	134.7	74.7	14	187.2	103.7	74	239.6	132.8
35	30.6	17.0	95	83.1	46.1	55	135.6	75.1	15	188.0	104.2	75	240.5	133.3
36	31.5	17.5	96	84.0	46.5	56	136.4	75.6	16	188.9	104.7	76	241.4	133.8
37	32.4	17.9	97	84.8	47.0	57	137.3	76.1	17	189.8	105.2	77	242.3	134.3
38	33.2	18.4	98	85.7	47.5	58	138.2	76.6	18	190.7	105.7	78	243.1	134.8
39	34.1	18.9	99	86.6	48.0	59	139.1	77.1	19	191.5	106.2	79	244.0	135.3
40	35.0	19.4	100	87.5	48.5	60	139.9	77.6	20	192.4	106.7	80	244.9	135.7
41	35.9	19.9	101	88.3	49.0	161	140.8	78.1	221	193.3	107.1	281	245.8	136.2
42	36.7	20.4	02	89.2	49.5	62	141.7	78.5	22	194.2	107.6	82	246.6	136.7
43	37.6	20.8	03	90.1	49.9	63	142.6	79.0	23	195.0	108.1	83	247.5	137.2
44	38.5	21.3	04	91.0	50.4	64	143.4	79.5	24	195.9	108.6	84	248.4	137.7
45	39.4	21.8	05	91.8	50.9	65	144.3	80.0	25	196.8	109.1	85	249.3	138.2
46	40.2	22.3	06	92.7	51.4	66	145.2	80.5	26	197.7	109.6	86	250.1	138.7
47	41.1	22.8	07	93.6	51.9	67	146.1	81.0	27	198.5	110.1	87	251.0	139.1
48	42.0	23.3	08	94.5	52.4	68	146.9	81.4	28	199.4	110.5	88	251.9	139.6
49	42.9	23.8	09	95.3	52.8	69	147.8	81.9	29	200.3	111.0	89	252.8	140.1
50	43.7	24.2	10	96.2	53.3	70	148.7	82.4	30	201.2	111.5	90	253.6	140.6
51	44.6	24.7	111	97.1	53.8	171	149.6	82.9	231	202.0	112.0	291	254.5	141.1
52	45.5	25.2	12	98.0	54.3	72	150.4	83.4	32	202.9	112.5	92	255.4	141.6
53	46.4	25.7	13	98.8	54.8	73	151.3	83.9	33	203.8	113.0	93	256.3	142.0
54	47.2	26.2	14	99.7	55.3	74	152.2	84.4	34	204.7	113.4	94	257.1	142.5
55	48.1	26.7	15	100.6	55.8	75	153.1	84.8	35	205.5	113.9	95	258.0	143.0
56	49.0	27.1	16	101.5	56.2	76	153.9	85.3	36	206.4	114.4	96	258.9	143.5
57	49.9	27.6	17	102.3	56.7	77	154.8	85.8	37	207.3	114.9	97	259.8	144.0
58	50.7	28.1	18	103.2	57.2	78	155.7	86.3	38	208.2	115.4	98	260.6	144.5
59	51.6	28.6	19	104.1	57.7	79	156.6	86.8	39	209.0	115.9	99	261.5	145.0
60	52.5	29.1	20	105.0	58.2	80	157.4	87.3	40	209.9	116.4	300	262.4	145.4
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

61° (119°, 241°, 299°).

TABLE 2.

Difference of Latitude and Departure for 29° (151°, 209°, 331°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	263.2	145.9	361	315.7	175.0	421	368.2	204.1	481	420.7	233.2	541	473.2	262.3
02	264.1	146.4	62	316.6	175.5	22	369.1	204.6	82	421.5	233.7	42	474.0	262.8
03	265.0	146.9	63	317.5	176.0	23	369.9	205.1	83	422.4	234.2	43	474.9	263.2
04	265.9	147.4	64	318.3	176.5	24	370.8	205.6	84	423.3	234.6	44	475.8	263.7
05	266.7	147.9	65	319.2	177.0	25	371.7	206.0	85	424.2	235.1	45	476.6	264.2
06	267.6	148.4	66	320.1	177.4	26	372.6	206.5	86	425.0	235.6	46	477.5	264.7
07	268.5	148.8	67	321.0	177.9	27	373.4	207.0	87	425.9	236.1	47	478.4	265.2
08	269.4	149.3	68	321.8	178.4	28	374.3	207.5	88	426.8	236.6	48	479.3	265.7
09	270.2	149.8	69	322.7	178.9	29	375.2	208.0	89	427.7	237.1	49	480.1	266.2
10	271.1	150.3	70	323.6	179.4	30	376.1	208.5	90	428.5	237.6	50	481.0	266.6
311	272.0	150.8	371	324.5	179.9	431	376.9	209.0	491	429.4	238.0	551	481.9	267.1
12	272.9	151.3	72	325.3	180.4	32	377.8	209.4	92	430.3	238.5	52	482.8	267.6
13	273.7	151.7	73	326.2	180.8	33	378.7	209.9	93	431.2	239.0	53	483.6	268.1
14	274.6	152.2	74	327.1	181.3	34	379.6	210.4	94	432.0	239.5	54	484.5	268.6
15	275.5	152.7	75	328.0	181.8	35	380.4	210.9	95	432.9	240.0	55	485.4	269.1
16	276.3	153.2	76	328.8	182.3	36	381.3	211.4	96	433.8	240.5	56	486.3	269.5
17	277.2	153.7	77	329.7	182.8	37	382.2	211.9	97	434.7	240.9	57	487.1	270.0
18	278.1	154.2	78	330.6	183.3	38	383.1	212.3	98	435.5	241.4	58	488.0	270.5
19	279.0	154.7	79	331.4	183.7	39	383.9	212.8	99	436.4	241.9	59	488.9	271.0
20	279.8	155.1	80	332.3	184.2	40	384.8	213.3	500	437.3	242.4	60	489.8	271.5
321	280.7	155.6	381	333.2	184.7	441	385.7	213.8	501	438.2	242.9	561	490.6	272.0
22	281.6	156.1	82	334.1	185.2	42	386.6	214.3	02	439.0	243.4	62	491.5	272.5
23	282.5	156.6	83	334.9	185.7	43	387.4	214.8	03	439.9	243.9	63	492.4	272.9
24	283.3	157.1	84	335.8	186.2	44	388.3	215.3	04	440.8	244.3	64	493.2	273.4
25	284.2	157.6	85	336.7	186.7	45	389.2	215.7	05	441.6	244.8	65	494.1	273.9
26	285.1	158.1	86	337.6	187.1	46	390.0	216.2	06	442.5	245.3	66	495.0	274.4
27	286.0	158.5	87	338.4	187.6	47	390.9	216.7	07	443.4	245.8	67	495.9	274.9
28	286.8	159.0	88	339.3	188.1	48	391.8	217.2	08	444.3	246.3	68	496.8	275.4
29	287.7	159.5	89	340.2	188.6	49	392.7	217.7	09	445.2	246.8	69	497.7	275.9
30	288.6	160.0	90	341.1	189.1	50	393.5	218.2	10	446.1	247.3	70	498.5	276.3
31	289.5	160.5	391	341.9	189.6	451	394.4	218.7	511	447.0	247.8	571	499.4	276.8
32	290.3	161.0	92	342.8	190.0	52	395.3	219.1	12	447.8	248.2	72	500.3	277.3
33	291.2	161.4	93	343.7	190.5	53	396.2	219.6	13	448.6	248.7	73	501.1	277.8
34	292.1	161.9	94	344.6	191.0	54	397.0	220.1	14	449.5	249.2	74	502.0	278.3
35	293.0	162.4	95	345.4	191.5	55	397.9	220.6	15	450.4	249.7	75	502.9	278.8
36	293.8	162.9	96	346.3	192.0	56	398.8	221.1	16	451.3	250.2	76	503.7	279.2
37	294.7	163.4	97	347.2	192.5	57	399.7	221.6	17	452.2	250.6	77	504.6	279.7
38	295.6	163.9	98	348.1	193.0	58	400.5	222.0	18	453.1	251.1	78	505.5	280.2
39	296.5	164.4	99	348.9	193.4	59	401.4	222.5	19	453.9	251.6	79	506.4	280.7
40	297.3	164.8	400	349.8	193.9	60	402.3	223.0	20	454.8	252.1	80	507.2	281.2
341	298.2	165.3	401	350.7	194.4	461	403.2	223.5	521	455.6	252.6	581	508.1	281.7
42	299.1	165.8	02	351.6	194.9	62	404.0	224.0	22	456.5	253.1	82	509.0	282.2
43	300.0	166.3	03	352.4	195.4	63	404.9	224.5	23	457.4	253.6	83	509.9	282.7
44	300.8	166.8	04	353.3	195.9	64	405.8	225.0	24	458.3	254.0	84	510.7	283.2
45	301.7	167.3	05	354.2	196.3	65	406.7	225.4	25	459.1	254.5	85	511.6	283.6
46	302.6	167.7	06	355.1	196.8	66	407.5	225.9	26	460.0	255.0	86	512.5	284.1
47	303.5	168.2	07	355.9	197.3	67	408.4	226.4	27	460.9	255.5	87	513.4	284.6
48	304.3	168.7	08	356.8	197.8	68	409.3	226.9	28	461.8	256.0	88	514.3	285.0
49	305.2	169.2	09	357.7	198.3	69	410.2	227.4	29	462.6	256.5	89	515.1	285.5
50	306.1	169.7	10	358.6	198.8	70	411.0	227.9	30	463.5	256.9	90	516.0	286.0
351	307.0	170.2	411	359.4	199.3	471	411.9	228.3	531	464.4	257.4	591	516.9	286.5
52	307.8	170.7	12	360.3	199.7	72	412.8	228.8	32	465.3	257.9	92	517.7	287.0
53	308.7	171.1	13	361.2	200.2	73	413.7	229.3	33	466.1	258.4	93	518.6	287.5
54	309.6	171.6	14	362.1	200.7	74	414.5	229.8	34	467.0	258.9	94	519.5	288.0
55	310.5	172.1	15	362.9	201.2	75	415.4	230.3	35	467.9	259.4	95	520.4	288.5
56	311.3	172.6	16	363.8	201.7	76	416.3	230.8	36	468.8	259.9	96	521.2	288.9
57	312.2	173.1	17	364.7	202.2	77	417.2	231.3	37	469.6	260.3	97	522.1	289.4
58	313.1	173.6	18	365.6	202.7	78	418.0	231.7	38	470.5	260.8	98	523.0	289.9
59	314.0	174.0	19	366.4	203.1	79	418.9	232.2	39	471.4	261.3	99	523.9	290.4
60	314.8	174.5	20	367.3	203.6	80	419.8	232.7	40	472.3	261.8	600	524.8	290.9
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

61° (119°, 241°, 299°).

TABLE 2.

Difference of Latitude and Departure for 30° (150°, 210°, 330°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.9	0.5	61	52.8	30.5	121	104.8	60.5	181	156.8	90.5	241	208.7	120.5
2	1.7	1.0	62	53.7	31.0	22	105.7	61.0	82	157.6	91.0	42	209.6	121.0
3	2.6	1.5	63	54.6	31.5	23	106.5	61.5	83	158.5	91.5	43	210.4	121.5
4	3.5	2.0	64	55.4	32.0	24	107.4	62.0	84	159.3	92.0	44	211.3	122.0
5	4.3	2.5	65	56.3	32.5	25	108.3	62.5	85	160.2	92.5	45	212.2	122.5
6	5.2	3.0	66	57.2	33.0	26	109.1	63.0	86	161.1	93.0	46	213.0	123.0
7	6.1	3.5	67	58.0	33.5	27	110.0	63.5	87	161.9	93.5	47	213.9	123.5
8	6.9	4.0	68	58.9	34.0	28	110.9	64.0	88	162.8	94.0	48	214.8	124.0
9	7.8	4.5	69	59.8	34.5	29	111.7	64.5	89	163.7	94.5	49	215.6	124.5
10	8.7	5.0	70	60.6	35.0	30	112.6	65.0	90	164.5	95.0	50	216.5	125.0
11	9.5	5.5	71	61.5	35.5	131	113.4	65.5	191	165.4	95.5	251	217.4	125.5
12	10.4	6.0	72	62.4	36.0	32	114.3	66.0	92	166.3	96.0	52	218.2	126.0
13	11.3	6.5	73	63.2	36.5	33	115.2	66.5	93	167.1	96.5	53	219.1	126.5
14	12.1	7.0	74	64.1	37.0	34	116.0	67.0	94	168.0	97.0	54	220.0	127.0
15	13.0	7.5	75	65.0	37.5	35	116.9	67.5	95	168.9	97.5	55	220.8	127.5
16	13.9	8.0	76	65.8	38.0	36	117.8	68.0	96	169.7	98.0	56	221.7	128.0
17	14.7	8.5	77	66.7	38.5	37	118.6	68.5	97	170.6	98.5	57	222.6	128.5
18	15.6	9.0	78	67.5	39.0	38	119.5	69.0	98	171.5	99.0	58	223.4	129.0
19	16.5	9.5	79	68.4	39.5	39	120.4	69.5	99	172.3	99.5	59	224.3	129.5
20	17.3	10.0	80	69.3	40.0	40	121.2	70.0	200	173.2	100.0	60	225.2	130.0
21	18.2	10.5	81	70.1	40.5	141	122.1	70.5	201	174.1	100.5	261	226.0	130.5
22	19.1	11.0	82	71.0	41.0	42	123.0	71.0	02	174.9	101.0	62	226.9	131.0
23	19.9	11.5	83	71.9	41.5	43	123.8	71.5	03	175.8	101.5	63	227.8	131.5
24	20.8	12.0	84	72.7	42.0	44	124.7	72.0	04	176.7	102.0	64	228.6	132.0
25	21.7	12.5	85	73.6	42.5	45	125.6	72.5	05	177.5	102.5	65	229.5	132.5
26	22.5	13.0	86	74.5	43.0	46	126.4	73.0	06	178.4	103.0	66	230.4	133.0
27	23.4	13.5	87	75.3	43.5	47	127.3	73.5	07	179.3	103.5	67	231.2	133.5
28	24.2	14.0	88	76.2	44.0	48	128.2	74.0	08	180.1	104.0	68	232.1	134.0
29	25.1	14.5	89	77.1	44.5	49	129.0	74.5	09	181.0	104.5	69	233.0	134.5
30	26.0	15.0	90	77.9	45.0	50	129.9	75.0	10	181.9	105.0	70	233.8	135.0
31	26.8	15.5	91	78.8	45.5	151	130.8	75.5	211	182.7	105.5	271	234.7	135.5
32	27.7	16.0	92	79.7	46.0	52	131.6	76.0	12	183.6	106.0	72	235.6	136.0
33	28.6	16.5	93	80.5	46.5	53	132.5	76.5	13	184.5	106.5	73	236.4	136.5
34	29.4	17.0	94	81.4	47.0	54	133.4	77.0	14	185.3	107.0	74	237.3	137.0
35	30.3	17.5	95	82.3	47.5	55	134.2	77.5	15	186.2	107.5	75	238.2	137.5
36	31.2	18.0	96	83.1	48.0	56	135.1	78.0	16	187.1	108.0	76	239.0	138.0
37	32.0	18.5	97	84.0	48.5	57	136.0	78.5	17	187.9	108.5	77	239.9	138.5
38	32.9	19.0	98	84.9	49.0	58	136.8	79.0	18	188.8	109.0	78	240.8	139.0
39	33.8	19.5	99	85.7	49.5	59	137.7	79.5	19	189.7	109.5	79	241.6	139.5
40	34.6	20.0	100	86.6	50.0	60	138.6	80.0	20	190.5	110.0	80	242.5	140.0
41	35.5	20.5	101	87.5	50.5	161	139.4	80.5	221	191.4	110.5	281	243.4	140.5
42	36.4	21.0	02	88.3	51.0	62	140.3	81.0	22	192.3	111.0	82	244.2	141.0
43	37.2	21.5	03	89.2	51.5	63	141.2	81.5	23	193.1	111.5	83	245.1	141.5
44	38.1	22.0	04	90.1	52.0	64	142.0	82.0	24	194.0	112.0	84	246.0	142.0
45	39.0	22.5	05	90.9	52.5	65	142.9	82.5	25	194.9	112.5	85	246.8	142.5
46	39.8	23.0	06	91.8	53.0	66	143.8	83.0	26	195.7	113.0	86	247.7	143.0
47	40.7	23.5	07	92.7	53.5	67	144.6	83.5	27	196.6	113.5	87	248.5	143.5
48	41.6	24.0	08	93.5	54.0	68	145.5	84.0	28	197.5	114.0	88	249.4	144.0
49	42.4	24.5	09	94.4	54.5	69	146.4	84.5	29	198.3	114.5	89	250.3	144.5
50	43.3	25.0	10	95.3	55.0	70	147.2	85.0	30	199.2	115.0	90	251.1	145.0
51	44.2	25.5	111	96.1	55.5	171	148.1	85.5	231	200.1	115.5	291	252.0	145.5
52	45.0	26.0	12	97.0	56.0	72	149.0	86.0	32	200.9	116.0	92	252.9	146.0
53	45.9	26.5	13	97.9	56.5	73	149.8	86.5	33	201.8	116.5	93	253.7	146.5
54	46.8	27.0	14	98.7	57.0	74	150.7	87.0	34	202.6	117.0	94	254.6	147.0
55	47.6	27.5	15	99.6	57.5	75	151.6	87.5	35	203.5	117.5	95	255.5	147.5
56	48.5	28.0	16	100.5	58.0	76	152.4	88.0	36	204.4	118.0	96	256.3	148.0
57	49.4	28.5	17	101.3	58.5	77	153.3	88.5	37	205.2	118.5	97	257.2	148.5
58	50.2	29.0	18	102.2	59.0	78	154.2	89.0	38	206.1	119.0	98	258.1	149.0
59	51.1	29.5	19	103.1	59.5	79	155.0	89.5	39	207.0	119.5	99	258.9	149.5
60	52.0	30.0	20	103.9	60.0	80	155.9	90.0	40	207.8	120.0	300	259.8	150.0
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

60° (120°, 240°, 300°).

TABLE 2.

Difference of Latitude and Departure for 30° (150°, 210°, 330°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	260.7	150.5	361	312.6	180.5	421	364.6	210.5	481	416.6	240.5	541	468.5	270.5
02	261.5	151.0	62	313.5	181.0	22	365.5	211.0	82	417.4	241.0	42	469.4	271.0
03	262.4	151.5	63	314.4	181.5	23	366.3	211.5	83	418.3	241.5	43	470.3	271.5
04	263.3	152.0	64	315.2	182.0	24	367.2	212.0	84	419.2	242.0	44	471.1	272.0
05	264.1	152.5	65	316.1	182.5	25	368.1	212.5	85	420.0	242.5	45	472.0	272.5
06	265.0	153.0	66	317.0	183.0	26	368.9	213.0	86	420.9	243.0	46	472.9	273.0
07	265.9	153.5	67	317.8	183.5	27	369.8	213.5	87	421.8	243.5	47	473.7	273.5
08	266.7	154.0	68	318.7	184.0	28	370.7	214.0	88	422.6	244.0	48	474.6	274.0
09	267.6	154.5	69	319.6	184.5	29	371.5	214.5	89	423.5	244.5	49	475.5	274.5
10	268.5	155.0	70	320.4	185.0	30	372.4	215.0	90	424.4	245.0	50	476.3	275.0
311	269.3	155.5	371	321.3	185.5	431	373.3	215.5	491	425.2	245.5	551	477.2	275.5
12	270.2	156.0	72	322.2	186.0	32	374.1	216.0	92	426.1	246.0	52	478.1	276.0
13	271.1	156.5	73	323.0	186.5	33	375.0	216.5	93	426.9	246.5	53	478.9	276.5
14	271.9	157.0	74	323.9	187.0	34	375.9	217.0	94	427.8	247.0	54	479.8	277.0
15	272.8	157.5	75	324.8	187.5	35	376.7	217.5	95	428.7	247.5	55	480.7	277.5
16	273.7	158.0	76	325.6	188.0	36	377.6	218.0	96	429.6	248.0	56	481.5	278.0
17	274.5	158.5	77	326.5	188.5	37	378.5	218.5	97	430.4	248.5	57	482.4	278.5
18	275.4	159.0	78	327.4	189.0	38	379.3	219.0	98	431.3	249.0	58	483.3	279.0
19	276.3	159.5	79	328.2	189.5	39	380.2	219.5	99	432.2	249.5	59	484.1	279.5
20	277.1	160.0	80	329.1	190.0	40	381.1	220.0	500	433.0	250.0	60	485.0	280.0
321	278.0	160.5	381	330.0	190.5	441	381.9	220.5	501	433.9	250.5	561	485.9	280.5
22	278.9	161.0	82	330.8	191.0	42	382.8	221.0	02	434.8	251.0	62	486.7	281.0
23	279.7	161.5	83	331.7	191.5	43	383.7	221.5	03	435.6	251.5	63	487.6	281.5
24	280.6	162.0	84	332.6	192.0	44	384.5	222.0	04	436.5	252.0	64	488.5	282.0
25	281.5	162.5	85	333.4	192.5	45	385.4	222.5	05	437.4	252.5	65	489.3	282.5
26	282.3	163.0	86	334.3	193.0	46	386.3	223.0	06	438.2	253.0	66	490.2	283.0
27	283.2	163.5	87	335.2	193.5	47	387.1	223.5	07	439.1	253.5	67	491.1	283.5
28	284.1	164.0	88	336.0	194.0	48	388.0	224.0	08	440.0	254.0	68	491.9	284.0
29	284.9	164.5	89	336.9	194.5	49	388.9	224.5	09	440.8	254.5	69	492.8	284.5
30	285.8	165.0	90	337.8	195.0	50	389.7	225.0	10	441.7	255.0	70	493.6	285.0
331	286.7	165.5	391	338.6	195.5	451	390.6	225.5	511	442.6	255.5	571	494.5	285.5
32	287.5	166.0	92	339.5	196.0	52	391.5	226.0	12	443.4	256.0	72	495.4	286.0
33	288.4	166.5	93	340.4	196.5	53	392.3	226.5	13	444.3	256.5	73	496.3	286.5
34	289.3	167.0	94	341.2	197.0	54	393.2	227.0	14	445.2	257.0	74	497.1	287.0
35	290.1	167.5	95	342.1	197.5	55	394.0	227.5	15	446.0	257.5	75	497.9	287.5
36	291.0	168.0	96	343.0	198.0	56	394.9	228.0	16	446.9	258.0	76	498.8	288.0
37	291.9	168.5	97	343.8	198.5	57	395.8	228.5	17	447.8	258.5	77	499.7	288.5
38	292.7	169.0	98	344.7	199.0	58	396.6	229.0	18	448.6	259.0	78	500.5	289.0
39	293.6	169.5	99	345.6	199.5	59	397.5	229.5	19	449.4	259.5	79	501.3	289.5
40	294.5	170.0	400	346.4	200.0	60	398.4	230.0	20	450.3	260.0	80	502.2	290.0
341	295.3	170.5	401	347.3	200.5	461	399.2	230.5	521	451.2	260.5	581	503.1	290.5
42	296.2	171.0	02	348.1	201.0	62	400.1	231.0	22	452.1	261.0	82	504.0	291.0
43	297.1	171.5	03	349.0	201.5	63	401.0	231.5	23	452.9	261.5	83	504.9	291.5
44	297.9	172.0	04	349.9	202.0	64	401.8	232.0	24	453.8	262.0	84	505.8	292.0
45	298.8	172.5	05	350.7	202.5	65	402.7	232.5	25	454.7	262.5	85	506.6	292.5
46	299.7	173.0	06	351.6	203.0	66	403.6	233.0	26	455.5	263.0	86	507.5	293.0
47	300.5	173.5	07	352.5	203.5	67	404.4	233.5	27	456.4	263.5	87	508.4	293.5
48	301.4	174.0	08	353.3	204.0	68	405.3	234.0	28	457.3	264.0	88	509.2	294.0
49	302.3	174.5	09	354.2	204.5	69	406.2	234.5	29	458.1	264.5	89	510.1	294.5
50	303.1	175.0	10	355.1	205.0	70	407.0	235.0	30	459.0	265.0	90	511.0	295.0
351	304.0	175.5	411	355.9	205.5	471	407.9	235.5	531	459.9	265.5	591	511.8	295.5
52	304.8	176.0	12	356.8	206.0	72	408.8	236.0	32	460.7	266.0	92	512.7	296.0
53	305.7	176.5	13	357.7	206.5	73	409.6	236.5	33	461.6	266.5	93	513.6	296.5
54	306.6	177.0	14	358.5	207.0	74	410.5	237.0	34	462.5	267.0	94	514.4	297.0
55	307.4	177.5	15	359.4	207.5	75	411.4	237.5	35	463.3	267.5	95	515.3	297.5
56	308.3	178.0	16	360.3	208.0	76	412.2	238.0	36	464.2	268.0	96	516.2	298.0
57	309.2	178.5	17	361.1	208.5	77	413.1	238.5	37	465.1	268.5	97	517.0	298.5
58	310.0	179.0	18	362.0	209.0	78	414.0	239.0	38	465.9	269.0	98	517.9	299.0
59	310.9	179.5	19	362.9	209.5	79	414.8	239.5	39	466.8	269.5	99	518.8	299.5
60	311.8	180.0	20	363.7	210.0	80	415.7	240.0	40	467.7	270.0	600	519.6	300.0
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

60° (120°, 240°, 300°).

TABLE 2.

Difference of Latitude and Departure for 31° (149°, 211°, 329°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.9	0.5	61	52.3	31.4	121	103.7	62.3	181	155.1	93.2	241	206.6	124.1
2	1.7	1.0	62	53.1	31.9	22	104.6	62.8	82	156.0	93.7	42	207.4	124.6
3	2.6	1.5	63	54.0	32.4	23	105.4	63.3	83	156.9	94.3	43	208.3	125.2
4	3.4	2.1	64	54.9	33.0	24	106.3	63.9	84	157.7	94.8	44	209.1	125.7
5	4.3	2.6	65	55.7	33.5	25	107.1	64.4	85	158.6	95.3	45	210.0	126.2
6	5.1	3.1	66	56.6	34.0	26	108.0	64.9	86	159.4	95.8	46	210.9	126.7
7	6.0	3.6	67	57.4	34.5	27	108.9	65.4	87	160.3	96.3	47	211.7	127.2
8	6.9	4.1	68	58.3	35.0	28	109.7	65.9	88	161.1	96.8	48	212.6	127.7
9	7.7	4.6	69	59.1	35.5	29	110.6	66.4	89	162.0	97.3	49	213.4	128.2
10	8.6	5.2	70	60.0	36.1	30	111.4	67.0	90	162.9	97.9	50	214.3	128.8
11	9.4	5.7	71	60.9	36.6	131	112.3	67.5	191	163.7	98.4	251	215.1	129.3
12	10.3	6.2	72	61.7	37.1	32	113.1	68.0	92	164.6	98.9	52	216.0	129.8
13	11.1	6.7	73	62.6	37.6	33	114.0	68.5	93	165.4	99.4	53	216.9	130.3
14	12.0	7.2	74	63.4	38.1	34	114.9	69.0	94	166.3	99.9	54	217.7	130.8
15	12.9	7.7	75	64.3	38.6	35	115.7	69.5	95	167.1	100.4	55	218.6	131.3
16	13.7	8.2	76	65.1	39.1	36	116.6	70.0	96	168.0	100.9	56	219.4	131.8
17	14.6	8.8	77	66.0	39.7	37	117.4	70.6	97	168.9	101.5	57	220.3	132.4
18	15.4	9.3	78	66.9	40.2	38	118.3	71.1	98	169.7	102.0	58	221.1	132.9
19	16.3	9.8	79	67.7	40.7	39	119.1	71.6	99	170.6	102.5	59	222.0	133.4
20	17.1	10.3	80	68.6	41.2	40	120.0	72.1	200	171.4	103.0	60	222.9	133.9
21	18.0	10.8	81	69.4	41.7	141	120.9	72.6	201	172.3	103.5	261	223.7	134.4
22	18.9	11.3	82	70.3	42.2	42	121.7	73.1	02	173.1	104.0	62	224.6	134.9
23	19.7	11.8	83	71.1	42.7	43	122.6	73.7	03	174.0	104.6	63	225.4	135.5
24	20.6	12.4	84	72.0	43.3	44	123.4	74.2	04	174.9	105.1	64	226.3	136.0
25	21.4	12.9	85	72.9	43.8	45	124.3	74.7	05	175.7	105.6	65	227.1	136.5
26	22.3	13.4	86	73.7	44.3	46	125.1	75.2	06	176.6	106.1	66	228.0	137.0
27	23.1	13.9	87	74.6	44.8	47	126.0	75.7	07	177.4	106.6	67	228.9	137.5
28	24.0	14.4	88	75.4	45.3	48	126.9	76.2	08	178.3	107.1	68	229.7	138.0
29	24.9	14.9	89	76.3	45.8	49	127.7	76.7	09	179.1	107.6	69	230.6	138.5
30	25.7	15.5	90	77.1	46.4	50	128.6	77.3	10	180.0	108.2	70	231.4	139.1
31	26.6	16.0	91	78.0	46.9	151	129.4	77.8	211	180.9	108.7	271	232.3	139.6
32	27.4	16.5	92	78.9	47.4	52	130.3	78.3	12	181.7	109.2	72	233.1	140.1
33	28.3	17.0	93	79.7	47.9	53	131.1	78.8	13	182.6	109.7	73	234.0	140.6
34	29.1	17.5	94	80.6	48.4	54	132.0	79.3	14	183.4	110.2	74	234.9	141.1
35	30.0	18.0	95	81.4	48.9	55	132.9	79.8	15	184.3	110.7	75	235.7	141.6
36	30.9	18.5	96	82.3	49.4	56	133.7	80.3	16	185.1	111.2	76	236.6	142.2
37	31.7	19.1	97	83.1	50.0	57	134.6	80.9	17	186.0	111.8	77	237.4	142.7
38	32.6	19.6	98	84.0	50.5	58	135.4	81.4	18	186.9	112.3	78	238.3	143.2
39	33.4	20.1	99	84.9	51.0	59	136.3	81.9	19	187.7	112.8	79	239.1	143.7
40	34.3	20.6	100	85.7	51.5	60	137.1	82.4	20	188.6	113.3	80	240.0	144.2
41	35.1	21.1	101	86.6	52.0	161	138.0	82.9	221	189.4	113.8	281	240.9	144.7
42	36.0	21.6	02	87.4	52.5	62	138.9	83.4	22	190.3	114.3	82	241.7	145.2
43	36.9	22.1	03	88.3	53.0	63	139.7	84.0	23	191.1	114.9	83	242.6	145.8
44	37.7	22.7	04	89.1	53.6	64	140.6	84.5	24	192.0	115.4	84	243.4	146.3
45	38.6	23.2	05	90.0	54.1	65	141.4	85.0	25	192.9	115.9	85	244.3	146.8
46	39.4	23.7	06	90.9	54.6	66	142.3	85.5	26	193.7	116.4	86	245.1	147.3
47	40.3	24.2	07	91.7	55.1	67	143.1	86.0	27	194.6	116.9	87	246.0	147.8
48	41.1	24.7	08	92.6	55.6	68	144.0	86.5	28	195.4	117.4	88	246.9	148.3
49	42.0	25.2	09	93.4	56.1	69	144.9	87.0	29	196.3	117.9	89	247.7	148.8
50	42.9	25.8	10	94.3	56.7	70	145.7	87.6	30	197.1	118.5	90	248.6	149.4
51	43.7	26.3	111	95.1	57.2	171	146.6	88.1	231	198.0	119.0	291	249.4	149.9
52	44.6	26.8	12	96.0	57.7	72	147.4	88.6	32	198.9	119.5	92	250.3	150.4
53	45.4	27.3	13	96.9	58.2	73	148.3	89.1	33	199.7	120.0	93	251.2	150.9
54	46.3	27.8	14	97.7	58.7	74	149.1	89.6	34	200.6	120.5	94	252.0	151.4
55	47.1	28.3	15	98.6	59.2	75	150.0	90.1	35	201.4	121.0	95	252.9	151.9
56	48.0	28.8	16	99.4	59.7	76	150.9	90.6	36	202.3	121.5	96	253.7	152.5
57	48.9	29.4	17	100.3	60.3	77	151.7	91.2	37	203.1	122.1	97	254.6	153.0
58	49.7	29.9	18	101.1	60.8	78	152.6	91.7	38	204.0	122.6	98	255.4	153.5
59	50.6	30.4	19	102.0	61.3	79	153.4	92.2	39	204.9	123.1	99	256.3	154.0
60	51.4	30.9	20	102.9	61.8	80	154.3	92.7	40	205.7	123.6	300	257.1	154.5
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

59° (121°, 239°, 301°).

TABLE 2.

Difference of Latitude and Departure for 31° (149°, 211°, 329°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	258.0	155.0	361	309.4	185.9	421	360.9	216.8	481	412.3	247.7	541	463.7	278.6
02	258.9	155.5	62	310.3	186.4	22	361.7	217.3	82	413.2	248.2	42	464.6	279.1
03	259.7	156.1	63	311.2	187.0	23	362.6	217.9	83	414.0	248.8	43	465.4	279.7
04	260.6	156.6	64	312.0	187.5	24	363.4	218.4	84	414.9	249.3	44	466.3	280.2
05	261.4	157.1	65	312.9	188.0	25	364.3	218.9	85	415.7	249.8	45	467.2	280.7
06	262.3	157.6	66	313.7	188.5	26	365.2	219.4	86	416.6	250.3	46	468.0	281.2
07	263.2	158.1	67	314.6	189.0	27	366.0	219.9	87	417.4	250.8	47	468.9	281.7
08	264.0	158.6	68	315.4	189.5	28	366.9	220.4	88	418.3	251.3	48	469.7	282.3
09	264.9	159.2	69	316.3	190.1	29	367.7	221.0	89	419.2	251.9	49	470.6	282.8
10	265.7	159.7	70	317.2	190.6	30	368.6	221.5	90	420.0	252.4	50	471.4	283.3
311	266.6	160.2	371	318.0	191.1	431	369.4	222.0	491	420.9	252.9	551	472.3	283.8
12	267.4	160.7	72	318.9	191.6	32	370.3	222.5	92	421.7	253.4	52	473.2	284.3
13	268.3	161.2	73	319.7	192.1	33	371.2	223.0	93	422.6	253.9	53	474.0	284.8
14	269.2	161.7	74	320.6	192.6	34	372.0	223.5	94	423.4	254.4	54	474.9	285.3
15	270.0	162.2	75	321.4	193.1	35	372.9	224.0	95	424.3	254.9	55	475.7	285.8
16	270.9	162.8	76	322.3	193.7	36	373.7	224.6	96	425.2	255.5	56	476.6	286.4
17	271.7	163.3	77	323.2	194.2	37	374.6	225.1	97	426.0	256.0	57	477.4	286.9
18	272.6	163.8	78	324.0	194.7	38	375.4	225.6	98	426.9	256.5	58	478.3	287.4
19	273.4	164.3	79	324.9	195.2	39	376.3	226.1	99	427.7	257.0	59	479.2	287.9
20	274.3	164.8	80	325.7	195.7	40	377.2	226.6	500	428.6	257.5	60	480.0	288.4
321	275.2	165.3	381	326.6	196.2	441	378.0	227.1	501	429.4	258.0	561	480.9	288.9
22	276.0	165.8	82	327.4	196.7	42	378.9	227.7	02	430.3	258.6	62	481.7	289.5
23	276.9	166.4	83	328.3	197.3	43	379.7	228.2	03	431.2	259.1	63	482.6	290.0
24	277.7	166.9	84	329.2	197.8	44	380.6	228.7	04	432.0	259.6	64	483.4	290.5
25	278.6	167.4	85	330.0	198.3	45	381.4	229.2	05	432.9	260.1	65	484.3	291.0
26	279.4	167.9	86	330.9	198.8	46	382.3	229.7	06	433.7	260.6	66	485.2	291.5
27	280.3	168.4	87	331.7	199.3	47	383.2	230.2	07	434.6	261.1	67	486.0	292.0
28	281.2	168.9	88	332.6	199.8	48	384.0	230.7	08	435.4	261.6	68	486.9	292.5
29	282.0	169.5	89	333.4	200.4	49	384.9	231.3	09	436.3	262.2	69	487.7	293.1
30	282.9	170.0	90	334.3	200.9	50	385.7	231.8	10	437.2	262.7	70	488.6	293.6
331	283.7	170.5	391	335.2	201.4	451	386.6	232.3	511	438.0	263.2	571	489.4	294.1
32	284.6	171.0	92	336.0	201.9	52	387.4	232.8	12	438.9	263.7	72	490.3	294.6
33	285.4	171.5	93	336.9	202.4	53	388.3	233.3	13	439.7	264.2	73	491.2	295.1
34	286.3	172.0	94	337.7	202.9	54	389.2	233.8	14	440.6	264.7	74	492.0	295.6
35	287.2	172.5	95	338.6	203.4	55	390.0	234.3	15	441.4	265.2	75	492.9	296.1
36	288.0	173.1	96	339.4	204.0	56	390.9	234.9	16	442.3	265.8	76	493.7	296.7
37	288.9	173.6	97	340.3	204.5	57	391.7	235.4	17	443.2	266.3	77	494.6	297.2
38	289.7	174.1	98	341.2	205.0	58	392.6	235.9	18	444.0	266.8	78	495.4	297.7
39	290.6	174.6	99	342.0	205.5	59	393.4	236.4	19	444.9	267.3	79	496.3	298.2
40	291.4	175.1	400	342.9	206.0	60	394.3	236.9	20	445.7	267.8	80	497.2	298.7
341	292.3	175.6	401	343.7	206.5	461	395.2	237.4	521	446.6	268.3	581	498.0	299.2
42	293.2	176.1	02	344.6	207.0	62	396.0	238.0	22	447.4	268.9	82	498.9	299.8
43	294.0	176.7	03	345.4	207.6	63	396.9	238.5	23	448.3	269.4	83	499.7	300.3
44	294.9	177.2	04	346.3	208.1	64	397.7	239.0	24	449.2	269.9	84	500.6	300.8
45	295.7	177.7	05	347.2	208.6	65	398.6	239.5	25	450.0	270.4	85	501.4	301.3
46	296.6	178.2	06	348.0	209.1	66	399.4	240.0	26	450.9	270.9	86	502.3	301.8
47	297.4	178.7	07	348.9	209.6	67	400.3	240.5	27	451.7	271.4	87	503.2	302.3
48	298.3	179.2	08	349.7	210.1	68	401.2	241.0	28	452.6	271.9	88	504.0	302.8
49	299.2	179.8	09	350.6	210.7	69	402.0	241.5	29	453.4	272.4	89	504.9	303.3
50	300.0	180.3	10	351.4	211.2	70	402.9	242.1	30	454.3	273.0	90	505.7	303.9
351	300.9	180.8	411	352.3	211.7	471	403.7	242.6	531	455.2	273.5	591	506.6	304.4
52	301.7	181.3	12	353.2	212.2	72	404.6	243.1	32	456.0	274.0	92	507.4	304.9
53	302.6	181.8	13	354.0	212.7	73	405.4	243.6	33	456.9	274.5	93	508.3	305.4
54	303.4	182.3	14	354.9	213.2	74	406.3	244.1	34	457.7	275.0	94	509.2	305.9
55	304.3	182.8	15	355.7	213.7	75	407.2	244.6	35	458.6	275.5	95	510.0	306.4
56	305.2	183.4	16	356.6	214.3	76	408.0	245.2	36	459.4	276.1	96	510.9	307.0
57	306.0	183.9	17	357.4	214.8	77	408.9	245.7	37	460.3	276.6	97	511.7	307.5
58	306.9	184.4	18	358.3	215.3	78	409.7	246.2	38	461.2	277.1	98	512.6	308.0
59	307.7	184.9	19	359.2	215.8	79	410.6	246.7	39	462.0	277.6	99	513.4	308.5
60	308.6	185.4	20	360.0	216.3	80	411.4	247.2	40	462.9	278.1	600	514.3	309.0
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

59° (121°, 239°, 301°).

TABLE 2.

Difference of Latitude and Departure for 32° (148°, 212°, 328°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.8	0.5	61	51.7	32.3	121	102.6	64.1	181	153.5	95.9	241	204.4	127.7
2	1.7	1.1	62	52.6	32.9	22	103.5	64.7	82	154.3	96.4	42	205.2	128.2
3	2.5	1.6	63	53.4	33.4	23	104.3	65.2	83	155.2	97.0	43	206.1	128.8
4	3.4	2.1	64	54.3	33.9	24	105.2	65.7	84	156.0	97.5	44	206.9	129.3
5	4.2	2.6	65	55.1	34.4	25	106.0	66.2	85	156.9	98.0	45	207.8	129.8
6	5.1	3.2	66	56.0	35.0	26	106.9	66.8	86	157.7	98.6	46	208.6	130.4
7	5.9	3.7	67	56.8	35.5	27	107.7	67.3	87	158.6	99.1	47	209.5	130.9
8	6.8	4.2	68	57.7	36.0	28	108.6	67.8	88	159.4	99.6	48	210.3	131.4
9	7.6	4.8	69	58.5	36.6	29	109.4	68.4	89	160.3	100.2	49	211.2	131.9
10	8.5	5.3	70	59.4	37.1	30	110.2	68.9	90	161.1	100.7	50	212.0	132.5
11	9.3	5.8	71	60.2	37.6	131	111.1	69.4	191	162.0	101.2	251	212.9	133.0
12	10.2	6.4	72	61.1	38.2	32	111.9	69.9	92	162.8	101.7	52	213.7	133.5
13	11.0	6.9	73	61.9	38.7	33	112.8	70.5	93	163.7	102.3	53	214.6	134.1
14	11.9	7.4	74	62.8	39.2	34	113.6	71.0	94	164.5	102.8	54	215.4	134.6
15	12.7	7.9	75	63.6	39.7	35	114.5	71.5	95	165.4	103.3	55	216.3	135.1
16	13.6	8.5	76	64.5	40.3	36	115.3	72.1	96	166.2	103.9	56	217.1	135.7
17	14.4	9.0	77	65.3	40.8	37	116.2	72.6	97	167.1	104.4	57	217.9	136.2
18	15.3	9.5	78	66.1	41.3	38	117.0	73.1	98	167.9	104.9	58	218.8	136.7
19	16.1	10.1	79	67.0	41.9	39	117.9	73.7	99	168.8	105.5	59	219.6	137.2
20	17.0	10.6	80	67.8	42.4	40	118.7	74.2	200	169.6	106.0	60	220.5	137.8
21	17.8	11.1	81	68.7	42.9	141	119.6	74.7	201	170.5	106.5	261	221.3	138.3
22	18.7	11.7	82	69.5	43.5	42	120.4	75.2	02	171.3	107.0	62	222.2	138.8
23	19.5	12.2	83	70.4	44.0	43	121.3	75.8	03	172.2	107.6	63	223.0	139.4
24	20.4	12.7	84	71.2	44.5	44	122.1	76.3	04	173.0	108.1	64	223.9	139.9
25	21.2	13.2	85	72.1	45.0	45	123.0	76.8	05	173.8	108.6	65	224.7	140.4
26	22.0	13.8	86	72.9	45.6	46	123.8	77.4	06	174.7	109.2	66	225.6	141.0
27	22.9	14.3	87	73.8	46.1	47	124.7	77.9	07	175.5	109.7	67	226.4	141.5
28	23.7	14.8	88	74.6	46.6	48	125.5	78.4	08	176.4	110.2	68	227.3	142.0
29	24.6	15.4	89	75.5	47.2	49	126.4	79.0	09	177.2	110.8	69	228.1	142.5
30	25.4	15.9	90	76.3	47.7	50	127.2	79.5	10	178.1	111.3	70	229.0	143.1
31	26.3	16.4	91	77.2	48.2	151	128.1	80.0	211	178.9	111.8	271	229.8	143.6
32	27.1	17.0	92	78.0	48.8	52	128.9	80.5	12	179.8	112.3	72	230.7	144.1
33	28.0	17.5	93	78.9	49.3	53	129.8	81.1	13	180.6	112.9	73	231.5	144.7
34	28.8	18.0	94	79.7	49.8	54	130.6	81.6	14	181.5	113.4	74	232.4	145.2
35	29.7	18.5	95	80.6	50.3	55	131.4	82.1	15	182.3	113.9	75	233.2	145.7
36	30.5	19.1	96	81.4	50.9	56	132.3	82.7	16	183.2	114.5	76	234.1	146.3
37	31.4	19.6	97	82.3	51.4	57	133.1	83.2	17	184.0	115.0	77	234.9	146.8
38	32.2	20.1	98	83.1	51.9	58	134.0	83.7	18	184.9	115.5	78	235.8	147.3
39	33.1	20.7	99	84.0	52.5	59	134.8	84.3	19	185.7	116.1	79	236.6	147.8
40	33.9	21.2	100	84.8	53.0	60	135.7	84.8	20	186.6	116.6	80	237.5	148.4
41	34.8	21.7	101	85.7	53.5	161	136.5	85.3	221	187.4	117.1	281	238.3	148.9
42	35.6	22.3	02	86.5	54.1	62	137.4	85.8	22	188.3	117.6	82	239.1	149.4
43	36.5	22.8	03	87.3	54.6	63	138.2	86.4	23	189.1	118.2	83	240.0	150.0
44	37.3	23.3	04	88.2	55.1	64	139.1	86.9	24	190.0	118.7	84	240.8	150.5
45	38.2	23.8	05	89.0	55.6	65	139.9	87.4	25	190.8	119.2	85	241.7	151.0
46	39.0	24.4	06	89.9	56.2	66	140.8	88.0	26	191.7	119.8	86	242.5	151.6
47	39.9	24.9	07	90.7	56.7	67	141.6	88.5	27	192.5	120.3	87	243.4	152.1
48	40.7	25.4	08	91.6	57.2	68	142.5	89.0	28	193.4	120.8	88	244.2	152.6
49	41.6	26.0	09	92.4	57.8	69	143.3	89.6	29	194.2	121.4	89	245.1	153.1
50	42.4	26.5	10	93.3	58.3	70	144.2	90.1	30	195.1	121.9	90	245.9	153.7
51	43.3	27.0	111	94.1	58.8	171	145.0	90.6	231	195.9	122.4	291	246.8	154.2
52	44.1	27.6	12	95.0	59.4	72	145.9	91.1	32	196.7	122.9	92	247.6	154.7
53	44.9	28.1	13	95.8	59.9	73	146.7	91.7	33	197.6	123.5	93	248.5	155.3
54	45.8	28.6	14	96.7	60.4	74	147.6	92.2	34	198.4	124.0	94	249.3	155.8
55	46.6	29.1	15	97.5	60.9	75	148.4	92.7	35	199.3	124.5	95	250.2	156.3
56	47.5	29.7	16	98.4	61.5	76	149.3	93.3	36	200.1	125.1	96	251.0	156.9
57	48.3	30.2	17	99.2	62.0	77	150.1	93.8	37	201.0	125.6	97	251.9	157.4
58	49.2	30.7	18	100.1	62.5	78	151.0	94.3	38	201.8	126.1	98	252.7	157.9
59	50.0	31.3	19	100.9	63.1	79	151.8	94.9	39	202.7	126.7	99	253.6	158.4
60	50.9	31.8	20	101.8	63.6	80	152.6	95.4	40	203.5	127.2	300	254.4	159.0
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

58° (122°, 238°, 302°).

TABLE 2.

Difference of Latitude and Departure for 32° (148°, 212°, 328°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	255.3	159.5	361	306.2	191.3	421	357.0	223.1	481	407.9	254.9	541	458.8	286.7
02	256.1	160.0	62	307.0	191.8	22	357.9	223.6	82	408.8	255.4	42	459.6	287.2
03	257.0	160.5	63	307.9	192.3	23	358.7	224.1	83	409.6	255.9	43	460.5	287.7
04	257.8	161.1	64	308.7	192.9	24	359.6	224.7	84	410.5	256.5	44	461.3	288.3
05	258.7	161.6	65	309.5	193.4	25	360.4	225.2	85	411.3	257.0	45	462.2	288.8
06	259.5	162.1	66	310.4	193.9	26	361.3	225.7	86	412.2	257.5	46	463.0	289.3
07	260.4	162.7	67	311.2	194.5	27	362.1	226.3	87	413.0	258.1	47	463.9	289.9
08	261.2	163.2	68	312.1	195.0	28	363.0	226.8	88	413.9	258.6	48	464.7	290.4
09	262.1	163.7	69	312.9	195.5	29	363.8	227.3	89	414.7	259.1	49	465.6	290.9
10	262.9	164.3	70	313.8	196.0	30	364.7	227.8	90	415.6	259.6	50	466.4	291.5
311	263.8	164.8	371	314.6	196.6	431	365.5	228.4	491	416.4	260.2	551	467.3	292.0
12	264.6	165.3	72	315.5	197.1	32	366.4	228.9	92	417.3	260.7	52	468.1	292.5
13	265.4	165.8	73	316.3	197.6	33	367.2	229.4	93	418.1	261.2	53	469.0	293.0
14	266.3	166.4	74	317.2	198.2	34	368.1	230.0	94	419.0	261.8	54	469.8	293.6
15	267.1	166.9	75	318.0	198.7	35	368.9	230.5	95	419.8	262.3	55	470.7	294.1
16	268.0	167.4	76	318.9	199.2	36	369.8	231.0	96	420.6	262.8	56	471.5	294.6
17	268.8	168.0	77	319.7	199.8	37	370.6	231.6	97	421.5	263.4	57	472.4	295.2
18	269.7	168.5	78	320.6	200.3	38	371.5	232.1	98	422.3	263.9	58	473.2	295.7
19	270.5	169.0	79	321.4	200.8	39	372.3	232.6	99	423.2	264.4	59	474.1	296.2
20	271.4	169.6	80	322.3	201.3	40	373.2	233.1	500	424.0	265.0	60	474.9	296.7
321	272.2	170.1	381	323.1	201.9	441	374.0	233.7	501	424.9	265.5	561	475.8	297.3
22	273.1	170.6	82	324.0	202.4	42	374.8	234.2	02	425.7	266.0	62	476.6	297.8
23	273.9	171.1	83	324.8	202.9	43	375.7	234.7	03	426.6	266.5	63	477.5	298.3
24	274.8	171.7	84	325.7	203.5	44	376.5	235.3	04	427.4	267.1	64	478.3	298.9
25	275.6	172.2	85	326.5	204.0	45	377.4	235.8	05	428.3	267.6	65	479.2	299.4
26	276.5	172.7	86	327.4	204.5	46	378.2	236.3	06	429.1	268.1	66	480.0	299.9
27	277.3	173.3	87	328.2	205.1	47	379.1	236.9	07	430.0	268.7	67	480.9	300.5
28	278.2	173.8	88	329.1	205.6	48	379.9	237.4	08	430.8	269.2	68	481.7	301.0
29	279.0	174.3	89	329.9	206.1	49	380.8	237.9	09	431.7	269.7	69	482.6	301.5
30	279.9	174.9	90	330.8	206.6	50	381.6	238.4	10	432.5	270.3	70	483.4	302.1
331	280.7	175.4	391	331.6	207.2	451	382.5	239.0	511	433.4	270.8	571	484.3	302.6
32	281.6	175.9	92	332.5	207.7	52	383.3	239.5	12	434.2	271.4	72	485.1	303.2
33	282.4	176.4	93	333.3	208.2	53	384.2	240.0	13	435.1	271.9	73	486.0	303.7
34	283.3	177.0	94	334.2	208.8	54	385.0	240.6	14	435.9	272.4	74	486.8	304.2
35	284.1	177.5	95	335.0	209.3	55	385.9	241.1	15	436.8	272.9	75	487.7	304.7
36	285.0	178.0	96	335.8	209.8	56	386.7	241.6	16	437.6	273.5	76	488.5	305.3
37	285.8	178.6	97	336.7	210.4	57	387.6	242.2	17	438.5	274.0	77	489.4	305.8
38	286.7	179.1	98	337.5	210.9	58	388.4	242.7	18	439.3	274.5	78	490.2	306.3
39	287.5	179.6	99	338.4	211.4	59	389.3	243.2	19	440.2	275.0	79	491.1	306.8
40	288.3	180.2	400	339.2	211.9	60	390.1	243.8	20	441.0	275.6	80	491.9	307.4
341	289.2	180.7	401	340.1	212.5	461	391.0	244.3	521	441.9	276.1	581	492.8	307.9
42	290.0	181.2	02	340.9	213.0	62	391.8	244.8	22	442.7	276.6	82	493.6	308.4
43	290.9	181.7	03	341.8	213.5	63	392.7	245.4	23	443.6	277.2	83	494.5	309.0
44	291.7	182.3	04	342.6	214.1	64	393.5	245.9	24	444.4	277.7	84	495.3	309.5
45	292.6	182.8	05	343.5	214.6	65	394.4	246.4	25	445.3	278.2	85	496.2	310.0
46	293.4	183.3	06	344.3	215.1	66	395.2	246.9	26	446.1	278.7	86	497.0	310.5
47	294.3	183.9	07	345.2	215.7	67	396.0	247.5	27	446.9	279.3	87	497.8	311.1
48	295.1	184.4	08	346.0	216.2	68	396.9	248.0	28	447.8	279.8	88	498.7	311.6
49	296.0	184.9	09	346.9	216.7	69	397.7	248.5	29	448.6	280.3	89	499.5	312.1
50	296.8	185.4	10	347.7	217.2	70	398.6	249.0	30	449.5	280.9	90	500.3	312.6
351	297.7	186.0	411	348.6	217.8	471	399.4	249.6	531	450.3	281.4	591	501.2	313.2
52	298.5	186.5	12	349.4	218.3	72	400.3	250.1	32	451.1	281.9	92	502.0	313.7
53	299.4	187.0	13	350.3	218.8	73	401.1	250.6	33	452.0	282.4	93	502.9	314.2
54	300.2	187.6	14	351.1	219.4	74	402.0	251.2	34	452.8	283.0	94	503.7	314.8
55	301.1	188.1	15	352.0	219.9	75	402.8	251.7	35	453.7	283.5	95	504.6	315.3
56	301.9	188.6	16	352.8	220.4	76	403.7	252.2	36	454.5	284.0	96	505.4	315.8
57	302.8	189.2	17	353.6	221.0	77	404.5	252.8	37	455.4	284.6	97	506.2	316.4
58	303.6	189.7	18	354.5	221.5	78	405.4	253.3	38	456.2	285.1	98	507.1	316.9
59	304.5	190.2	19	355.3	222.0	79	406.2	253.8	39	457.1	285.6	99	508.0	317.4
60	305.3	190.8	20	356.2	222.5	80	407.1	254.3	40	457.9	286.2	600	508.8	318.0
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

58° (122°, 238°, 302°).

TABLE 2.

Difference of Latitude and Departure for 33° (147°, 213°, 327°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.8	0.5	61	51.2	33.2	121	101.5	65.9	181	151.8	98.6	241	202.1	131.3
2	1.7	1.1	62	52.0	33.8	22	102.3	66.4	82	152.6	99.1	42	203.0	131.8
3	2.5	1.6	63	52.8	34.3	23	103.2	67.0	83	153.5	99.7	43	203.8	132.3
4	3.4	2.2	64	53.7	34.9	24	104.0	67.5	84	154.3	100.2	44	204.6	132.9
5	4.2	2.7	65	54.5	35.4	25	104.8	68.1	85	155.2	100.8	45	205.5	133.4
6	5.0	3.3	66	55.4	35.9	26	105.7	68.6	86	156.0	101.3	46	206.3	134.0
7	5.9	3.8	67	56.2	36.5	27	106.5	69.2	87	156.8	101.8	47	207.2	134.5
8	6.7	4.4	68	57.0	37.0	28	107.3	69.7	88	157.7	102.4	48	208.0	135.1
9	7.5	4.9	69	57.9	37.6	29	108.2	70.3	89	158.5	102.9	49	208.8	135.6
10	8.4	5.4	70	58.7	38.1	30	109.0	70.8	90	159.3	103.5	50	209.7	136.2
11	9.2	6.0	71	59.5	38.7	131	109.9	71.3	191	160.2	104.0	251	210.5	136.7
12	10.1	6.5	72	60.4	39.2	32	110.7	71.9	92	161.0	104.6	52	211.3	137.2
13	10.9	7.1	73	61.2	39.8	33	111.5	72.4	93	161.9	105.1	53	212.2	137.8
14	11.7	7.6	74	62.1	40.3	34	112.4	73.0	94	162.7	105.7	54	213.0	138.3
15	12.6	8.2	75	62.9	40.8	35	113.2	73.5	95	163.5	106.2	55	213.9	138.9
16	13.4	8.7	76	63.7	41.4	36	114.1	74.1	96	164.4	106.7	56	214.7	139.4
17	14.3	9.3	77	64.6	41.9	37	114.9	74.6	97	165.2	107.3	57	215.5	140.0
18	15.1	9.8	78	65.4	42.5	38	115.7	75.2	98	166.1	107.8	58	216.4	140.5
19	15.9	10.3	79	66.3	43.0	39	116.6	75.7	99	166.9	108.4	59	217.2	141.1
20	16.8	10.9	80	67.1	43.6	40	117.4	76.2	200	167.7	108.9	60	218.1	141.6
21	17.6	11.4	81	67.9	44.1	141	118.3	76.8	201	168.6	109.5	261	218.9	142.2
22	18.5	12.0	82	68.8	44.7	42	119.1	77.3	02	169.4	110.0	62	219.7	142.7
23	19.3	12.5	83	69.6	45.2	43	119.9	77.9	03	170.3	110.6	63	220.6	143.2
24	20.1	13.1	84	70.4	45.7	44	120.8	78.4	04	171.1	111.1	64	221.4	143.8
25	21.0	13.6	85	71.3	46.3	45	121.6	79.0	05	171.9	111.7	65	222.2	144.3
26	21.8	14.2	86	72.1	46.8	46	122.4	79.5	06	172.8	112.2	66	223.1	144.9
27	22.6	14.7	87	73.0	47.4	47	123.3	80.1	07	173.6	112.7	67	223.9	145.4
28	23.5	15.2	88	73.8	47.9	48	124.1	80.6	08	174.4	113.3	68	224.8	146.0
29	24.3	15.8	89	74.6	48.5	49	125.0	81.2	09	175.3	113.8	69	225.6	146.5
30	25.2	16.3	90	75.5	49.0	50	125.8	81.7	10	176.1	114.4	70	226.4	147.1
31	26.0	16.9	91	76.3	49.6	151	126.6	82.2	211	177.0	114.9	271	227.3	147.6
32	26.8	17.4	92	77.2	50.1	52	127.5	82.8	12	177.8	115.5	72	228.1	148.1
33	27.7	18.0	93	78.0	50.7	53	128.3	83.3	13	178.6	116.0	73	229.0	148.7
34	28.5	18.5	94	78.8	51.2	54	129.2	83.9	14	179.5	116.6	74	229.8	149.2
35	29.4	19.1	95	79.7	51.7	55	130.0	84.4	15	180.3	117.1	75	230.6	149.8
36	30.2	19.6	96	80.5	52.3	56	130.8	85.0	16	181.2	117.6	76	231.5	150.3
37	31.0	20.2	97	81.4	52.8	57	131.7	85.5	17	182.0	118.2	77	232.3	150.9
38	31.9	20.7	98	82.2	53.4	58	132.5	86.1	18	182.8	118.7	78	233.2	151.4
39	32.7	21.2	99	83.0	53.9	59	133.3	86.6	19	183.7	119.3	79	234.0	152.0
40	33.5	21.8	100	83.9	54.5	60	134.2	87.1	20	184.5	119.8	80	234.8	152.5
41	34.4	22.3	101	84.7	55.0	161	135.0	87.7	221	185.3	120.4	281	235.7	153.0
42	35.2	22.9	02	85.5	55.6	62	135.9	88.2	22	186.2	120.9	82	236.5	153.6
43	36.1	23.4	03	86.4	56.1	63	136.7	88.8	23	187.0	121.5	83	237.3	154.1
44	36.9	24.0	04	87.2	56.6	64	137.5	89.3	24	187.9	122.0	84	238.2	154.7
45	37.7	24.5	05	88.1	57.2	65	138.4	89.9	25	188.7	122.5	85	239.0	155.2
46	38.6	25.1	06	88.9	57.7	66	139.2	90.4	26	189.5	123.1	86	239.9	155.8
47	39.4	25.6	07	89.7	58.3	67	140.1	91.0	27	190.4	123.6	87	240.7	156.3
48	40.3	26.1	08	90.6	58.8	68	140.9	91.5	28	191.2	124.2	88	241.5	156.9
49	41.1	26.7	09	91.4	59.4	69	141.7	92.0	29	192.1	124.7	89	242.4	157.4
50	41.9	27.2	10	92.3	59.9	70	142.6	92.6	30	192.9	125.3	90	243.2	157.9
51	42.8	27.8	111	93.1	60.5	171	143.4	93.1	231	193.7	125.8	291	244.1	158.5
52	43.6	28.3	12	93.9	61.0	72	144.3	93.7	32	194.6	126.4	92	244.9	159.0
53	44.4	28.9	13	94.8	61.5	73	145.1	94.2	33	195.4	126.9	93	245.7	159.6
54	45.3	29.4	14	95.6	62.1	74	145.9	94.8	34	196.2	127.4	94	246.6	160.1
55	46.1	30.0	15	96.4	62.6	75	146.8	95.3	35	197.1	128.0	95	247.4	160.7
56	47.0	30.5	16	97.3	63.2	76	147.6	95.9	36	197.9	128.5	96	248.2	161.2
57	47.8	31.0	17	98.1	63.7	77	148.4	96.4	37	198.8	129.1	97	249.1	161.8
58	48.6	31.6	18	99.0	64.3	78	149.3	96.9	38	199.6	129.6	98	249.9	162.3
59	49.5	32.1	19	99.8	64.8	79	150.1	97.5	39	200.4	130.2	99	250.8	162.8
60	50.3	32.7	20	100.6	65.4	80	151.0	98.0	40	201.3	130.7	300	251.6	163.4
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

57° (123°, 237°, 303°).

TABLE 2.

Difference of Latitude and Departure for 33° (147°, 213°, 327°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	252.4	163.9	361	302.8	196.6	421	353.1	229.3	481	403.4	262.0	541	453.7	294.6
02	253.3	164.4	62	303.6	197.1	22	353.9	229.8	82	404.2	262.5	42	454.6	295.2
03	254.1	165.0	63	304.4	197.7	23	354.7	230.4	83	405.1	263.1	43	455.4	295.7
04	255.0	165.5	64	305.3	198.2	24	355.6	230.9	84	405.9	263.6	44	456.2	296.2
05	255.8	166.1	65	306.1	198.8	25	356.4	231.4	85	406.7	264.1	45	457.1	296.8
06	256.6	166.6	66	307.0	199.3	26	357.3	232.0	86	407.6	264.7	46	457.9	297.3
07	257.5	167.2	67	307.8	199.8	27	358.1	232.5	87	408.4	265.2	47	458.8	297.9
08	258.3	167.7	68	308.6	200.4	28	359.0	233.1	88	409.3	265.8	48	459.6	298.4
09	259.2	168.3	69	309.5	200.9	29	359.8	233.6	89	410.1	266.3	49	460.4	299.0
10	260.0	168.8	70	310.3	201.5	30	360.6	234.2	90	411.0	266.8	50	461.3	299.5
311	260.8	169.3	371	311.2	202.0	431	361.5	234.7	491	411.8	267.4	551	462.1	300.1
12	261.7	169.9	72	312.0	202.6	32	362.3	235.2	92	412.6	267.9	52	463.0	300.6
13	262.5	170.4	73	312.8	203.1	33	363.1	235.8	93	413.5	268.5	53	463.8	301.2
14	263.3	171.0	74	313.7	203.7	34	364.0	236.3	94	414.3	269.0	54	464.6	301.7
15	264.2	171.5	75	314.5	204.2	35	364.8	236.9	95	415.1	269.6	55	465.5	302.3
16	265.0	172.1	76	315.3	204.7	36	365.7	237.4	96	416.0	270.1	56	466.3	302.9
17	265.9	172.6	77	316.2	205.3	37	366.5	238.0	97	416.8	270.7	57	467.2	303.4
18	266.7	173.2	78	317.0	205.8	38	367.3	238.5	98	417.6	271.2	58	468.0	303.9
19	267.5	173.7	79	317.9	206.4	39	368.2	239.1	99	418.5	271.8	59	468.8	304.5
20	268.4	174.2	80	318.7	206.9	40	369.0	239.6	500	419.3	272.3	60	469.7	305.0
321	269.2	174.8	381	319.5	207.5	441	369.9	240.1	501	420.2	272.8	561	470.5	305.5
22	270.1	175.3	82	320.4	208.0	42	370.7	240.7	02	421.0	273.4	62	471.3	306.1
23	270.9	175.9	83	321.2	208.6	43	371.5	241.2	03	421.9	273.9	63	472.2	306.6
24	271.7	176.4	84	322.1	209.1	44	372.4	241.8	04	422.7	274.5	64	473.0	307.2
25	272.6	177.0	85	322.9	209.6	45	373.2	242.3	05	423.5	275.0	65	473.8	307.7
26	273.4	177.5	86	323.7	210.2	46	374.1	242.9	06	424.4	275.6	66	474.7	308.3
27	274.2	178.1	87	324.6	210.7	47	374.9	243.4	07	425.2	276.1	67	475.5	308.8
28	275.1	178.6	88	325.4	211.3	48	375.7	244.0	08	426.0	276.7	68	476.4	309.4
29	275.9	179.1	89	326.2	211.8	49	376.6	244.5	09	426.9	277.2	69	477.2	309.9
30	276.8	179.7	90	327.1	212.4	50	377.4	245.1	10	427.7	277.8	70	478.0	310.4
331	277.6	180.2	391	327.9	212.9	451	378.2	245.6	511	428.5	278.3	571	478.9	311.0
32	278.4	180.8	92	328.8	213.5	52	379.1	246.1	12	429.4	278.8	72	479.7	311.5
33	279.3	181.3	93	329.6	214.0	53	379.9	246.7	13	430.2	279.4	73	480.6	312.0
34	280.1	181.9	94	330.4	214.6	54	380.8	247.2	14	431.1	279.9	74	481.4	312.6
35	281.0	182.4	95	331.3	215.1	55	381.6	247.8	15	431.9	280.4	75	482.2	313.1
36	281.8	183.0	96	332.1	215.6	56	382.4	248.3	16	432.7	281.0	76	483.1	313.7
37	282.6	183.5	97	333.0	216.2	57	383.3	248.9	17	433.6	281.5	77	483.9	314.2
38	283.5	184.1	98	333.8	216.7	58	384.1	249.4	18	434.4	282.1	78	484.7	314.8
39	284.3	184.6	99	334.6	217.3	59	385.0	250.0	19	435.3	282.6	79	485.6	315.3
40	285.2	185.1	400	335.5	217.8	60	385.8	250.5	20	436.1	283.2	80	486.4	315.9
341	286.0	185.7	401	336.3	218.4	461	386.6	251.0	521	436.9	283.7	581	487.2	316.4
42	286.8	186.2	02	337.1	218.9	62	387.5	251.6	22	437.8	284.3	82	488.1	317.0
43	287.7	186.8	03	338.0	219.5	63	388.3	252.1	23	438.6	284.8	83	488.9	317.5
44	288.5	187.3	04	338.8	220.0	64	389.1	252.7	24	439.4	285.4	84	489.8	318.1
45	289.3	187.9	05	339.7	220.5	65	390.0	253.2	25	440.3	285.9	85	490.6	318.6
46	290.2	188.4	06	340.5	221.1	66	390.8	253.8	26	441.1	286.5	86	491.5	319.2
47	291.0	189.0	07	341.3	221.6	67	391.7	254.3	27	442.0	287.0	87	492.3	319.7
48	291.9	189.5	08	342.2	222.2	68	392.5	254.9	28	442.8	287.5	88	493.1	320.2
49	292.7	190.0	09	343.0	222.7	69	393.3	255.4	29	443.6	288.1	89	494.0	320.8
50	293.5	190.6	10	343.9	223.3	70	394.2	255.9	30	444.5	288.6	90	494.8	321.3
351	294.4	191.1	411	344.7	223.8	471	395.0	256.5	531	445.3	289.2	591	495.7	321.9
52	295.2	191.7	12	345.5	224.4	72	395.8	257.0	32	446.1	289.7	92	496.5	322.4
53	296.1	192.2	13	346.4	224.9	73	396.7	257.6	33	447.0	290.3	93	497.3	322.9
54	296.9	192.8	14	347.2	225.4	74	397.5	258.1	34	447.8	290.8	94	498.1	323.5
55	297.7	193.3	15	348.1	226.0	75	398.3	258.7	35	448.7	291.4	95	499.0	324.1
56	298.6	193.9	16	348.9	226.5	76	399.2	259.2	36	449.5	291.9	96	499.8	324.6
57	299.4	194.4	17	349.7	227.1	77	400.0	259.8	37	450.3	292.5	97	500.6	325.1
58	300.2	194.9	18	350.6	227.6	78	400.9	260.3	38	451.2	293.0	98	501.5	325.7
59	301.1	195.5	19	351.4	228.2	79	401.7	260.9	39	452.0	293.6	99	502.3	326.2
60	301.9	196.0	20	352.2	228.7	80	402.6	261.4	40	452.9	294.1	600	503.2	326.8
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

57° (123°, 237°, 303°).

TABLE 2.

Difference of Latitude and Departure for 34° (146°, 214°, 326°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.8	0.6	61	50.6	34.1	121	100.3	67.7	181	150.1	101.2	241	199.8	134.8
2	1.7	1.1	62	51.4	34.7	22	101.1	68.2	82	150.9	101.8	42	200.6	135.3
3	2.5	1.7	63	52.2	35.2	23	102.0	68.8	83	151.7	102.3	43	201.5	135.9
4	3.3	2.2	64	53.1	35.8	24	102.8	69.3	84	152.5	102.9	44	202.3	136.4
5	4.1	2.8	65	53.9	36.3	25	103.6	69.9	85	153.4	103.5	45	203.1	137.0
6	5.0	3.4	66	54.7	36.9	26	104.5	70.5	86	154.2	104.0	46	203.9	137.6
7	5.8	3.9	67	55.5	37.5	27	105.3	71.0	87	155.0	104.6	47	204.8	138.1
8	6.6	4.5	68	56.4	38.0	28	106.1	71.6	88	155.9	105.1	48	205.6	138.7
9	7.5	5.0	69	57.2	38.6	29	106.9	72.1	89	156.7	105.7	49	206.4	139.2
10	8.3	5.6	70	58.0	39.1	30	107.8	72.7	90	157.5	106.2	50	207.3	139.8
11	9.1	6.2	71	58.9	39.7	131	108.6	73.3	191	158.3	106.8	251	208.1	140.4
12	9.9	6.7	72	59.7	40.3	32	109.4	73.8	92	159.2	107.4	52	208.9	140.9
13	10.8	7.3	73	60.5	40.8	33	110.3	74.4	93	160.0	107.9	53	209.7	141.5
14	11.6	7.8	74	61.3	41.4	34	111.1	74.9	94	160.8	108.5	54	210.6	142.0
15	12.4	8.4	75	62.2	41.9	35	111.9	75.5	95	161.7	109.0	55	211.4	142.6
16	13.3	8.9	76	63.0	42.5	36	112.7	76.1	96	162.5	109.6	56	212.2	143.2
17	14.1	9.5	77	63.8	43.1	37	113.6	76.6	97	163.3	110.2	57	213.1	143.7
18	14.9	10.1	78	64.7	43.6	38	114.4	77.2	98	164.1	110.7	58	213.9	144.3
19	15.8	10.6	79	65.5	44.2	39	115.2	77.7	99	165.0	111.3	59	214.7	144.8
20	16.6	11.2	80	66.3	44.7	40	116.1	78.3	200	165.8	111.8	60	215.5	145.4
21	17.4	11.7	81	67.2	45.3	141	116.9	78.8	201	166.6	112.4	261	216.4	145.9
22	18.2	12.3	82	68.0	45.9	42	117.7	79.4	02	167.5	113.0	62	217.2	146.5
23	19.1	12.9	83	68.8	46.4	43	118.6	80.0	03	168.3	113.5	63	218.0	147.1
24	19.9	13.4	84	69.6	47.0	44	119.4	80.5	04	169.1	114.1	64	218.9	147.6
25	20.7	14.0	85	70.5	47.5	45	120.2	81.1	05	170.0	114.6	65	219.7	148.2
26	21.6	14.5	86	71.3	48.1	46	121.0	81.6	06	170.8	115.2	66	220.5	148.7
27	22.4	15.1	87	72.1	48.6	47	121.9	82.2	07	171.6	115.8	67	221.4	149.3
28	23.2	15.7	88	73.0	49.2	48	122.7	82.8	08	172.4	116.3	68	222.2	149.9
29	24.0	16.2	89	73.8	49.8	49	123.5	83.3	09	173.3	116.9	69	223.0	150.4
30	24.9	16.8	90	74.6	50.3	50	124.4	83.9	10	174.1	117.4	70	223.8	151.0
31	25.7	17.3	91	75.4	50.9	151	125.2	84.4	211	174.9	118.0	271	224.7	151.5
32	26.5	17.9	92	76.3	51.4	52	126.0	85.0	12	175.8	118.5	72	225.5	152.1
33	27.4	18.5	93	77.1	52.0	53	126.8	85.6	13	176.6	119.1	73	226.3	152.7
34	28.2	19.0	94	77.9	52.6	54	127.7	86.1	14	177.4	119.7	74	227.2	153.2
35	29.0	19.6	95	78.8	53.1	55	128.5	86.7	15	178.2	120.2	75	228.0	153.8
36	29.8	20.1	96	79.6	53.7	56	129.3	87.2	16	179.1	120.8	76	228.8	154.3
37	30.7	20.7	97	80.4	54.2	57	130.2	87.8	17	179.9	121.3	77	229.6	154.9
38	31.5	21.2	98	81.2	54.8	58	131.0	88.4	18	180.7	121.9	78	230.5	155.5
39	32.3	21.8	99	82.1	55.4	59	131.8	88.9	19	181.6	122.5	79	231.3	156.0
40	33.2	22.4	100	82.9	55.9	60	132.6	89.5	20	182.4	123.0	80	232.1	156.6
41	34.0	22.9	101	83.7	56.5	161	133.5	90.0	221	183.2	123.6	281	233.0	157.1
42	34.8	23.5	02	84.6	57.0	62	134.3	90.6	22	184.0	124.1	82	233.8	157.7
43	35.6	24.0	03	85.4	57.6	63	135.1	91.1	23	184.9	124.7	83	234.6	158.3
44	36.5	24.6	04	86.2	58.2	64	136.0	91.7	24	185.7	125.3	84	235.4	158.8
45	37.3	25.2	05	87.0	58.7	65	136.8	92.3	25	186.5	125.8	85	236.3	159.4
46	38.1	25.7	06	87.9	59.3	66	137.6	92.8	26	187.4	126.4	86	237.1	159.9
47	39.0	26.3	07	88.7	59.8	67	138.4	93.4	27	188.2	126.9	87	237.9	160.5
48	39.8	26.8	08	89.5	60.4	68	139.3	93.9	28	189.0	127.5	88	238.8	161.0
49	40.6	27.4	09	90.4	61.0	69	140.1	94.5	29	189.8	128.1	89	239.6	161.6
50	41.5	28.0	10	91.2	61.5	70	140.9	95.1	30	190.7	128.6	90	240.4	162.2
51	42.3	28.5	111	92.0	62.1	171	141.8	95.6	231	191.5	129.2	291	241.2	162.7
52	43.1	29.1	12	92.9	62.6	72	142.6	96.2	32	192.3	129.7	92	242.1	163.3
53	43.9	29.6	13	93.7	63.2	73	143.4	96.7	33	193.2	130.3	93	242.9	163.8
54	44.8	30.2	14	94.5	63.7	74	144.3	97.3	34	194.0	130.9	94	243.7	164.4
55	45.6	30.8	15	95.3	64.3	75	145.1	97.9	35	194.8	131.4	95	244.6	165.0
56	46.4	31.3	16	96.2	64.9	76	145.9	98.4	36	195.7	132.0	96	245.4	165.5
57	47.3	31.9	17	97.0	65.4	77	146.7	99.0	37	196.5	132.5	97	246.2	166.1
58	48.1	32.4	18	97.8	66.0	78	147.6	99.5	38	197.3	133.1	98	247.1	166.6
59	48.9	33.0	19	98.7	66.5	79	148.4	100.1	39	198.1	133.6	99	247.9	167.2
60	49.7	33.6	20	99.5	67.1	80	149.2	100.7	40	199.0	134.2	300	248.7	167.8
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

56° (124°, 236°, 304°).

TABLE 2.

Difference of Latitude and Departure for 34° (146°, 214°, 326°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	249.5	168.3	361	299.3	201.9	421	349.0	235.4	481	398.8	269.0	541	448.5	302.5
02	250.4	168.9	62	300.1	202.4	22	349.9	236.0	82	399.6	269.5	42	449.4	303.1
03	251.2	169.4	63	300.9	203.0	23	350.7	236.5	83	400.4	270.1	43	450.2	303.6
04	252.0	170.0	64	301.8	203.5	24	351.5	237.1	84	401.3	270.6	44	451.0	304.2
05	252.9	170.6	65	302.6	204.1	25	352.3	237.7	85	402.1	271.2	45	451.8	304.8
06	253.7	171.1	66	303.4	204.7	26	353.2	238.2	86	402.9	271.8	46	452.6	305.3
07	254.5	171.7	67	304.3	205.2	27	354.0	238.8	87	403.8	272.3	47	453.5	305.9
08	255.3	172.2	68	305.1	205.8	28	354.8	239.3	88	404.6	272.8	48	454.3	306.4
09	256.2	172.8	69	305.9	206.3	29	355.7	239.9	89	405.4	273.4	49	455.2	307.0
10	257.0	173.3	70	306.7	206.9	30	356.5	240.4	90	406.2	274.0	50	456.0	307.5
311	257.8	173.9	371	307.6	207.5	431	357.3	241.0	491	407.1	274.6	551	456.8	308.1
12	258.7	174.5	72	308.4	208.0	32	358.1	241.6	92	407.9	275.1	52	457.6	308.7
13	259.5	175.0	73	309.2	208.6	33	359.0	242.1	93	408.7	275.7	53	458.4	309.2
14	260.3	175.6	74	310.1	209.1	34	359.8	242.7	94	409.5	276.2	54	459.3	309.8
15	261.2	176.1	75	310.9	209.7	35	360.6	243.2	95	410.4	276.8	55	460.1	310.3
16	262.0	176.7	76	311.7	210.3	36	361.5	243.8	96	411.2	277.4	56	460.9	310.9
17	262.8	177.3	77	312.6	210.8	37	362.3	244.4	97	412.0	277.9	57	461.7	311.5
18	263.7	177.8	78	313.4	211.4	38	363.1	244.9	98	412.8	278.4	58	462.6	312.0
19	264.5	178.4	79	314.2	211.9	39	364.0	245.5	99	413.7	279.0	59	463.4	312.6
20	265.3	178.9	80	315.0	212.5	40	364.8	246.0	500	414.5	279.6	60	464.2	313.1
321	266.1	179.5	381	315.9	213.0	441	365.6	246.6	501	415.3	280.1	561	465.1	313.7
22	267.0	180.1	82	316.7	213.6	42	366.4	247.2	02	416.2	280.7	62	465.9	314.3
23	267.8	180.6	83	317.5	214.2	43	367.3	247.7	03	417.0	281.3	63	466.8	314.8
24	268.6	181.2	84	318.4	214.7	44	368.1	248.3	04	417.8	281.8	64	467.6	315.4
25	269.5	181.7	85	319.2	215.3	45	368.9	248.8	05	418.6	282.4	65	468.4	315.9
26	270.3	182.3	86	320.0	215.8	46	369.8	249.4	06	419.4	282.9	66	469.2	316.5
27	271.1	182.9	87	320.8	216.4	47	370.6	250.0	07	420.3	283.5	67	470.1	317.1
28	271.9	183.4	88	321.7	217.0	48	371.4	250.5	08	421.1	284.1	68	470.9	317.6
29	272.8	184.0	89	322.5	217.5	49	372.2	251.1	09	421.9	284.6	69	471.7	318.2
30	273.6	184.5	90	323.3	218.1	50	373.1	251.6	10	422.8	285.2	70	472.6	318.7
331	274.4	185.1	391	324.2	218.6	451	373.9	252.2	511	423.6	285.8	571	473.4	319.3
32	275.2	185.6	92	325.0	219.2	52	374.7	252.8	12	424.4	286.3	72	474.2	319.9
33	276.1	186.2	93	325.8	219.8	53	375.6	253.3	13	425.3	286.9	73	475.0	320.4
34	276.9	186.8	94	326.6	220.3	54	376.4	253.9	14	426.1	287.4	74	475.9	321.0
35	277.7	187.3	95	327.5	220.9	55	377.2	254.4	15	426.9	288.0	75	476.7	321.5
36	278.6	187.9	96	328.3	221.4	56	378.0	255.0	16	427.8	288.5	76	477.5	322.1
37	279.4	188.4	97	329.1	222.0	57	378.9	255.5	17	428.6	289.1	77	478.3	322.7
38	280.2	189.0	98	330.0	222.6	58	379.7	256.1	18	429.4	289.6	78	479.2	323.2
39	281.0	189.6	99	330.8	223.1	59	380.5	256.7	19	430.3	290.2	79	480.0	323.8
40	281.9	190.1	400	331.6	223.7	60	381.3	257.2	20	431.1	290.8	80	480.8	324.3
341	282.7	190.7	401	332.4	224.2	461	382.2	257.8	521	431.9	291.3	581	481.6	324.9
42	283.5	191.2	02	333.3	224.8	62	383.0	258.3	22	432.8	291.9	82	482.5	325.4
43	284.4	191.8	03	334.1	225.4	63	383.8	258.9	23	433.6	292.5	83	483.3	326.0
44	285.2	192.4	04	334.9	225.9	64	384.7	259.5	24	434.4	293.0	84	484.1	326.6
45	286.0	192.9	05	335.8	226.5	65	385.5	260.0	25	435.3	293.6	85	485.0	327.2
46	286.9	193.5	06	336.6	227.0	66	386.3	260.6	26	436.1	294.1	86	485.8	327.7
47	287.7	194.0	07	337.4	227.6	67	387.2	261.1	27	436.9	294.7	87	486.6	328.2
48	288.5	194.6	08	338.3	228.1	68	388.0	261.7	28	437.8	295.3	88	487.5	328.8
49	289.3	195.2	09	339.1	228.7	69	388.8	262.3	29	438.6	295.8	89	488.3	329.4
50	290.2	195.7	10	339.9	229.3	70	389.7	262.8	30	439.4	296.4	90	489.2	329.9
351	291.0	196.3	411	340.7	229.8	471	390.5	263.4	531	440.3	296.9	591	490.0	330.5
52	291.8	196.8	12	341.6	230.4	72	391.3	263.9	32	441.1	297.4	92	490.8	331.0
53	292.7	197.4	13	342.4	230.9	73	392.1	264.5	33	441.9	298.0	93	491.6	331.6
54	293.5	198.0	14	343.2	231.5	74	393.0	265.0	34	442.7	298.6	94	492.5	332.2
55	294.3	198.5	15	344.1	232.1	75	393.8	265.6	35	443.6	299.1	95	493.3	332.7
56	295.1	199.1	16	344.9	232.6	76	394.6	266.2	36	444.4	299.7	96	494.1	333.3
57	296.0	199.6	17	345.7	233.2	77	395.5	266.7	37	445.3	300.2	97	494.9	333.8
58	296.8	200.2	18	346.5	233.7	78	396.3	267.3	38	446.1	300.8	98	495.8	334.4
59	297.6	200.7	19	347.4	234.3	79	397.1	267.9	39	446.9	301.4	99	496.6	334.9
60	298.5	201.3	20	348.2	234.9	80	397.9	268.4	40	447.7	302.0	600	497.4	335.5
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

56° (124°, 236°, 304°).

TABLE 2.

Difference of Latitude and Departure for 35° (145°, 215°, 325°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.8	0.6	61	50.0	35.0	121	99.1	69.4	181	148.3	103.8	241	197.4	138.2
2	1.6	1.1	62	50.8	35.6	22	99.9	70.0	82	149.1	104.4	42	198.2	138.8
3	2.5	1.7	63	51.6	36.1	23	100.8	70.5	83	149.9	105.0	43	199.1	139.4
4	3.3	2.3	64	52.4	36.7	24	101.6	71.1	84	150.7	105.5	44	199.9	140.0
5	4.1	2.9	65	53.2	37.3	25	102.4	71.7	85	151.5	106.1	45	200.7	140.5
6	4.9	3.4	66	54.1	37.9	26	103.2	72.3	86	152.4	106.7	46	201.5	141.1
7	5.7	4.0	67	54.9	38.4	27	104.0	72.8	87	153.2	107.3	47	202.3	141.7
8	6.6	4.6	68	55.7	39.0	28	104.9	73.4	88	154.0	107.8	48	203.1	142.2
9	7.4	5.2	69	56.5	39.6	29	105.7	74.0	89	154.8	108.4	49	204.0	142.8
10	8.2	5.7	70	57.3	40.2	30	106.5	74.6	90	155.6	109.0	50	204.8	143.4
11	9.0	6.3	71	58.2	40.7	131	107.3	75.1	191	156.5	109.6	251	205.6	144.0
12	9.8	6.9	72	59.0	41.3	32	108.1	75.7	92	157.3	110.1	52	206.4	144.5
13	10.6	7.5	73	59.8	41.9	33	108.9	76.3	93	158.1	110.7	53	207.2	145.1
14	11.5	8.0	74	60.6	42.4	34	109.8	76.9	94	158.9	111.3	54	208.1	145.7
15	12.3	8.6	75	61.4	43.0	35	110.6	77.4	95	159.7	111.8	55	208.9	146.3
16	13.1	9.2	76	62.3	43.6	36	111.4	78.0	96	160.6	112.4	56	209.7	146.8
17	13.9	9.8	77	63.1	44.2	37	112.2	78.6	97	161.4	113.0	57	210.5	147.4
18	14.7	10.3	78	63.9	44.7	38	113.0	79.2	98	162.2	113.6	58	211.3	148.0
19	15.6	10.9	79	64.7	45.3	39	113.9	79.7	99	163.0	114.1	59	212.2	148.6
20	16.4	11.5	80	65.5	45.9	40	114.7	80.3	200	163.8	114.7	60	213.0	149.1
21	17.2	12.0	81	66.4	46.5	141	115.5	80.9	201	164.6	115.3	261	213.8	149.7
22	18.0	12.6	82	67.2	47.0	42	116.3	81.4	02	165.5	115.9	62	214.6	150.3
23	18.8	13.2	83	68.0	47.6	43	117.1	82.0	03	166.3	116.4	63	215.4	150.9
24	19.7	13.8	84	68.8	48.2	44	118.0	82.6	04	167.1	117.0	64	216.3	151.4
25	20.5	14.3	85	69.6	48.8	45	118.8	83.2	05	167.9	117.6	65	217.1	152.0
26	21.3	14.9	86	70.4	49.3	46	119.6	83.7	06	168.7	118.2	66	217.9	152.6
27	22.1	15.5	87	71.3	49.9	47	120.4	84.3	07	169.6	118.7	67	218.7	153.1
28	22.9	16.1	88	72.1	50.5	48	121.2	84.9	08	170.4	119.3	68	219.5	153.7
29	23.8	16.6	89	72.9	51.0	49	122.1	85.5	09	171.2	119.9	69	220.4	154.3
30	24.6	17.2	90	73.7	51.6	50	122.9	86.0	10	172.0	120.5	70	221.2	154.9
31	25.4	17.8	91	74.5	52.2	151	123.7	86.6	211	172.8	121.0	271	222.0	155.4
32	26.2	18.4	92	75.4	52.8	52	124.5	87.2	12	173.7	121.6	72	222.8	156.0
33	27.0	18.9	93	76.2	53.3	53	125.3	87.8	13	174.5	122.2	73	223.6	156.6
34	27.9	19.5	94	77.0	53.9	54	126.1	88.3	14	175.3	122.7	74	224.4	157.2
35	28.7	20.1	95	77.8	54.5	55	127.0	88.9	15	176.1	123.3	75	225.3	157.7
36	29.5	20.6	96	78.6	55.1	56	127.8	89.5	16	176.9	123.9	76	226.1	158.3
37	30.3	21.2	97	79.5	55.6	57	128.6	90.1	17	177.8	124.5	77	226.9	158.9
38	31.1	21.8	98	80.3	56.2	58	129.4	90.6	18	178.6	125.0	78	227.7	159.5
39	31.9	22.4	99	81.1	56.8	59	130.2	91.2	19	179.4	125.6	79	228.5	160.0
40	32.8	22.9	100	81.9	57.4	60	131.1	91.8	20	180.2	126.2	80	229.4	160.6
41	33.6	23.5	101	82.7	57.9	161	131.9	92.3	221	181.0	126.8	281	230.2	161.2
42	34.4	24.1	02	83.6	58.5	62	132.7	92.9	22	181.9	127.3	82	231.0	161.7
43	35.2	24.7	03	84.4	59.1	63	133.5	93.5	23	182.7	127.9	83	231.8	162.3
44	36.0	25.2	04	85.2	59.7	64	134.3	94.1	24	183.5	128.5	84	232.6	162.9
45	36.9	25.8	05	86.0	60.2	65	135.2	94.6	25	184.3	129.1	85	233.5	163.5
46	37.7	26.4	06	86.8	60.8	66	136.0	95.2	26	185.1	129.6	86	234.3	164.0
47	38.5	27.0	07	87.6	61.4	67	136.8	95.8	27	185.9	130.2	87	235.1	164.6
48	39.3	27.5	08	88.5	61.9	68	137.6	96.4	28	186.8	130.8	88	235.9	165.2
49	40.1	28.1	09	89.3	62.5	69	138.4	96.9	29	187.6	131.3	89	236.7	165.8
50	41.0	28.7	10	90.1	63.1	70	139.3	97.5	30	188.4	131.9	90	237.6	166.3
51	41.8	29.3	111	90.9	63.7	171	140.1	98.1	231	189.2	132.5	291	238.4	166.9
52	42.6	29.8	12	91.7	64.2	72	140.9	98.7	32	190.0	133.1	92	239.2	167.5
53	43.4	30.4	13	92.6	64.8	73	141.7	99.2	33	190.9	133.6	93	240.0	168.1
54	44.2	31.0	14	93.4	65.4	74	142.5	99.8	34	191.7	134.2	94	240.8	168.6
55	45.1	31.5	15	94.2	66.0	75	143.4	100.4	35	192.5	134.8	95	241.6	169.2
56	45.9	32.1	16	95.0	66.5	76	144.2	100.9	36	193.3	135.4	96	242.5	169.8
57	46.7	32.7	17	95.8	67.1	77	145.0	101.5	37	194.1	135.9	97	243.3	170.4
58	47.5	33.3	18	96.7	67.7	78	145.8	102.1	38	195.0	136.5	98	244.1	170.9
59	48.3	33.8	19	97.5	68.3	79	146.6	102.7	39	195.8	137.1	99	244.9	171.5
60	49.1	34.4	20	98.3	68.8	80	147.4	103.2	40	196.6	137.7	300	245.7	172.1
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

55° (125°, 235°, 305°).

TABLE 2.

Difference of Latitude and Departure for 35° (145°, 215°, 325°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	246.6	172.6	361	295.7	207.0	421	344.9	241.5	481	394.0	275.9	541	443.2	310.3
02	247.4	173.2	62	296.5	207.6	22	345.7	242.0	82	394.8	276.4	42	444.0	310.9
03	248.2	173.8	63	297.4	208.2	23	346.5	242.6	83	395.7	277.0	43	444.8	311.4
04	249.0	174.3	64	298.2	208.8	24	347.3	243.2	84	396.5	277.6	44	445.6	312.0
05	249.9	174.9	65	299.0	209.3	25	348.1	243.8	85	397.3	278.2	45	446.4	312.6
06	250.7	175.5	66	299.8	209.9	26	349.0	244.3	86	398.1	278.7	46	447.3	313.2
07	251.5	176.1	67	300.6	210.5	27	349.8	244.9	87	398.9	279.3	47	448.1	313.7
08	252.3	176.6	68	301.5	211.1	28	350.6	245.5	88	399.8	279.9	48	448.9	314.3
09	253.1	177.2	69	302.3	211.6	29	351.4	246.0	89	400.6	280.5	49	449.7	314.9
10	253.9	177.8	70	303.1	212.2	30	352.2	246.6	90	401.4	281.0	50	450.5	315.4
311	254.8	178.4	371	303.9	212.8	431	353.1	247.2	491	402.2	281.6	551	451.4	316.0
12	255.6	178.9	72	304.7	213.4	32	353.9	247.8	92	403.0	282.2	52	452.2	316.6
13	256.4	179.5	73	305.6	213.9	33	354.7	248.3	93	403.9	282.8	53	453.0	317.2
14	257.2	180.1	74	306.4	214.5	34	355.5	248.9	94	404.7	283.3	54	453.8	317.7
15	258.0	180.7	75	307.2	215.1	35	356.3	249.5	95	405.5	283.9	55	454.6	318.3
16	258.9	181.2	76	308.0	215.6	36	357.2	250.1	96	406.3	284.5	56	455.5	318.9
17	259.7	181.8	77	308.8	216.2	37	358.0	250.6	97	407.1	285.1	57	456.3	319.5
18	260.5	182.4	78	309.6	216.8	38	358.8	251.2	98	408.0	285.6	58	457.1	320.0
19	261.3	183.0	79	310.5	217.4	39	359.6	251.8	99	408.8	286.2	59	457.9	320.6
20	262.1	183.5	80	311.3	217.9	40	360.4	252.4	500	409.6	286.8	60	458.7	321.2
321	263.0	184.1	381	312.1	218.5	441	361.3	252.9	501	410.4	287.4	561	459.6	321.8
22	263.8	184.7	82	312.9	219.1	42	362.1	253.5	02	411.2	287.9	62	460.4	322.3
23	264.6	185.2	83	313.7	219.7	43	362.9	254.1	03	412.1	288.5	63	461.2	322.9
24	265.4	185.8	84	314.6	220.2	44	363.7	254.7	04	412.9	289.1	64	462.0	323.5
25	266.2	186.4	85	315.4	220.8	45	364.5	255.2	05	413.7	289.7	65	462.8	324.1
26	267.1	187.0	86	316.2	221.4	46	365.4	255.8	06	414.5	290.2	66	463.7	324.6
27	267.9	187.5	87	317.0	222.0	47	366.2	256.4	07	415.3	290.8	67	464.5	325.2
28	268.7	188.1	88	317.8	222.5	48	367.0	256.9	08	416.1	291.4	68	465.3	325.8
29	269.5	188.7	89	318.7	223.1	49	367.8	257.5	09	417.0	291.9	69	466.1	326.4
30	270.3	189.3	90	319.5	223.7	50	368.6	258.1	10	417.8	292.5	70	466.9	326.9
331	271.1	189.8	391	320.3	224.3	451	369.4	258.7	511	418.6	293.1	571	467.8	327.5
32	272.0	190.4	92	321.1	224.8	52	370.3	259.2	12	419.4	293.7	72	468.6	328.1
33	272.8	191.0	93	321.9	225.4	53	371.1	259.8	13	420.2	294.2	73	469.4	328.7
34	273.6	191.6	94	322.8	226.0	54	371.9	260.4	14	421.1	294.8	74	470.2	329.2
35	274.4	192.1	95	323.6	226.5	55	372.7	261.0	15	421.9	295.4	75	471.0	329.8
36	275.2	192.7	96	324.4	227.1	56	373.5	261.5	16	422.7	296.0	76	471.9	330.4
37	276.1	193.3	97	325.2	227.7	57	374.4	262.1	17	423.5	296.5	77	472.7	331.0
38	276.9	193.9	98	326.0	228.3	58	375.2	262.7	18	424.3	297.1	78	473.5	331.5
39	277.7	194.4	99	326.9	228.8	59	376.0	263.3	19	425.2	297.7	79	474.3	332.1
40	278.5	195.0	400	327.7	229.4	60	376.8	263.8	20	426.0	298.3	80	475.1	332.7
341	279.3	195.6	401	328.5	230.0	461	377.6	264.4	521	426.8	298.8	581	476.0	333.3
42	280.2	196.1	02	329.3	230.6	62	378.5	265.0	22	427.6	299.4	82	476.8	333.8
43	281.0	196.7	03	330.1	231.1	63	379.3	265.5	23	428.4	300.0	83	477.6	334.4
44	281.8	197.3	04	330.9	231.7	64	380.1	266.1	24	429.3	300.5	84	478.4	335.0
45	282.6	197.9	05	331.8	232.3	65	380.9	266.7	25	430.1	301.1	85	479.2	335.6
46	283.4	198.4	06	332.6	232.9	66	381.7	267.3	26	430.9	301.7	86	480.1	336.1
47	284.3	199.0	07	333.4	233.4	67	382.6	267.8	27	431.7	302.3	87	480.9	336.7
48	285.1	199.6	08	334.2	234.0	68	383.4	268.4	28	432.5	302.8	88	481.7	337.3
49	285.9	200.2	09	335.0	234.6	69	384.2	269.0	29	433.4	303.4	89	482.5	337.9
50	286.7	200.7	10	335.9	235.1	70	385.0	269.6	30	434.2	304.0	90	483.3	338.4
351	287.5	201.3	411	336.7	235.7	471	385.8	270.1	531	435.0	304.5	591	484.2	339.0
52	288.3	201.9	12	337.5	236.3	72	386.6	270.7	32	435.8	305.1	92	485.0	339.6
53	289.2	202.5	13	338.3	236.9	73	387.5	271.3	33	436.6	305.7	93	485.8	340.2
54	290.0	203.0	14	339.1	237.4	74	388.3	271.9	34	437.5	306.3	94	486.6	340.7
55	290.8	203.6	15	340.0	238.0	75	389.1	272.4	35	438.3	306.8	95	487.4	341.3
56	291.6	204.2	16	340.8	238.6	76	389.9	273.0	36	439.1	307.4	96	488.3	341.9
57	292.4	204.7	17	341.6	239.2	77	390.7	273.6	37	439.9	308.0	97	489.1	342.5
58	293.3	205.3	18	342.4	239.7	78	391.6	274.2	38	440.7	308.6	98	489.9	343.0
59	294.1	205.9	19	343.2	240.3	79	392.4	274.7	39	441.5	309.1	99	490.7	343.6
60	294.9	206.5	20	344.1	240.9	80	393.2	275.3	40	442.3	309.7	600	491.5	344.1
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

55° (125°, 235°, 305°).

TABLE 2.

Difference of Latitude and Departure for 36° (144°, 216°, 324°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.8	0.6	61	49.4	35.9	121	97.9	71.1	181	146.4	106.4	241	195.0	141.7
2	1.6	1.2	62	50.2	36.4	22	98.7	71.7	82	147.2	107.0	42	195.8	142.2
3	2.4	1.8	63	51.0	37.0	23	99.5	72.3	83	148.1	107.6	43	196.6	142.8
4	3.2	2.4	64	51.8	37.6	24	100.3	72.9	84	148.9	108.2	44	197.4	143.4
5	4.0	2.9	65	52.6	38.2	25	101.1	73.5	85	149.7	108.7	45	198.2	144.0
6	4.9	3.5	66	53.4	38.8	26	101.9	74.1	86	150.5	109.3	46	199.0	144.6
7	5.7	4.1	67	54.2	39.4	27	102.7	74.6	87	151.3	109.9	47	199.8	145.2
8	6.5	4.7	68	55.0	40.0	28	103.6	75.2	88	152.1	110.5	48	200.6	145.8
9	7.3	5.3	69	55.8	40.6	29	104.4	75.8	89	152.9	111.1	49	201.4	146.4
10	8.1	5.9	70	56.6	41.1	30	105.2	76.4	90	153.7	111.7	50	202.3	146.9
11	8.9	6.5	71	57.4	41.7	131	106.0	77.0	191	154.5	112.3	251	203.1	147.5
12	9.7	7.1	72	58.2	42.3	32	106.8	77.6	92	155.3	112.9	52	203.9	148.1
13	10.5	7.6	73	59.1	42.9	33	107.6	78.2	93	156.1	113.4	53	204.7	148.7
14	11.3	8.2	74	59.9	43.5	34	108.4	78.8	94	156.9	114.0	54	205.5	149.3
15	12.1	8.8	75	60.7	44.1	35	109.2	79.4	95	157.8	114.6	55	206.3	149.9
16	12.9	9.4	76	61.5	44.7	36	110.0	79.9	96	158.6	115.2	56	207.1	150.5
17	13.8	10.0	77	62.3	45.3	37	110.8	80.5	97	159.4	115.8	57	207.9	151.1
18	14.6	10.6	78	63.1	45.8	38	111.6	81.1	98	160.2	116.4	58	208.7	151.6
19	15.4	11.2	79	63.9	46.4	39	112.5	81.7	99	161.0	117.0	59	209.5	152.2
20	16.2	11.8	80	64.7	47.0	40	113.3	82.3	200	161.8	117.6	60	210.3	152.8
21	17.0	12.3	81	65.5	47.6	141	114.1	82.9	201	162.6	118.1	261	211.2	153.4
22	17.8	12.9	82	66.3	48.2	42	114.9	83.5	02	163.4	118.7	62	212.0	154.0
23	18.6	13.5	83	67.1	48.8	43	115.7	84.1	03	164.2	119.3	63	212.8	154.6
24	19.4	14.1	84	68.0	49.4	44	116.5	84.6	04	165.0	119.9	64	213.6	155.2
25	20.2	14.7	85	68.8	50.0	45	117.3	85.2	05	165.8	120.5	65	214.4	155.8
26	21.0	15.3	86	69.6	50.5	46	118.1	85.8	06	166.7	121.1	66	215.2	156.4
27	21.8	15.9	87	70.4	51.1	47	118.9	86.4	07	167.5	121.7	67	216.0	156.9
28	22.7	16.5	88	71.2	51.7	48	119.7	87.0	08	168.3	122.3	68	216.8	157.5
29	23.5	17.0	89	72.0	52.3	49	120.5	87.6	09	169.1	122.8	69	217.6	158.1
30	24.3	17.6	90	72.8	52.9	50	121.4	88.2	10	169.9	123.4	70	218.4	158.7
31	25.1	18.2	91	73.6	53.5	151	122.2	88.8	211	170.7	124.0	271	219.2	159.3
32	25.9	18.8	92	74.4	54.1	52	123.0	89.3	12	171.5	124.6	72	220.1	159.9
33	26.7	19.4	93	75.2	54.7	53	123.8	89.9	13	172.3	125.2	73	220.9	160.5
34	27.5	20.0	94	76.0	55.3	54	124.6	90.5	14	173.1	125.8	74	221.7	161.1
35	28.3	20.6	95	76.9	55.8	55	125.4	91.1	15	173.9	126.4	75	222.5	161.6
36	29.1	21.2	96	77.7	56.4	56	126.2	91.7	16	174.7	127.0	76	223.3	162.2
37	29.9	21.7	97	78.5	57.0	57	127.0	92.3	17	175.6	127.5	77	224.1	162.8
38	30.7	22.3	98	79.3	57.6	58	127.8	92.9	18	176.4	128.1	78	224.9	163.4
39	31.6	22.9	99	80.1	58.2	59	128.6	93.5	19	177.2	128.7	79	225.7	164.0
40	32.4	23.5	100	80.9	58.8	60	129.4	94.0	20	178.0	129.3	80	226.5	164.6
41	33.2	24.1	101	81.7	59.4	161	130.3	94.6	221	178.8	129.9	281	227.3	165.2
42	34.0	24.7	02	82.5	60.0	62	131.1	95.2	22	179.6	130.5	82	228.1	165.8
43	34.8	25.3	03	83.3	60.5	63	131.9	95.8	23	180.4	131.1	83	229.0	166.3
44	35.6	25.9	04	84.1	61.1	64	132.7	96.4	24	181.2	131.7	84	229.8	166.9
45	36.4	26.5	05	84.9	61.7	65	133.5	97.0	25	182.0	132.3	85	230.6	167.5
46	37.2	27.0	06	85.8	62.3	66	134.3	97.6	26	182.8	132.8	86	231.4	168.1
47	38.0	27.6	07	86.6	62.9	67	135.1	98.2	27	183.6	133.4	87	232.2	168.7
48	38.8	28.2	08	87.4	63.5	68	135.9	98.7	28	184.5	134.0	88	233.0	169.3
49	39.6	28.8	09	88.2	64.1	69	136.7	99.3	29	185.3	134.6	89	233.8	169.9
50	40.5	29.4	10	89.0	64.7	70	137.5	99.9	30	186.1	135.2	90	234.6	170.5
51	41.3	30.0	111	89.8	65.2	171	138.3	100.5	231	186.9	135.8	291	235.4	171.0
52	42.1	30.6	12	90.6	65.8	72	139.2	101.1	32	187.7	136.4	92	236.2	171.6
53	42.9	31.2	13	91.4	66.4	73	140.0	101.7	33	188.5	137.0	93	237.0	172.2
54	43.7	31.7	14	92.2	67.0	74	140.8	102.3	34	189.3	137.5	94	237.9	172.8
55	44.5	32.3	15	93.0	67.6	75	141.6	102.9	35	190.1	138.1	95	238.7	173.4
56	45.3	32.9	16	93.8	68.2	76	142.4	103.5	36	190.9	138.7	96	239.5	174.0
57	46.1	33.5	17	94.7	68.8	77	143.2	104.0	37	191.7	139.3	97	240.3	174.6
58	46.9	34.1	18	95.5	69.4	78	144.0	104.6	38	192.5	139.9	98	241.1	175.2
59	47.7	34.7	19	96.3	69.9	79	144.8	105.2	39	193.4	140.5	99	241.9	175.7
60	48.5	35.3	20	97.1	70.5	80	145.6	105.8	40	194.2	141.1	300	242.7	176.3
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

54° (126°, 234°, 306°).

TABLE 2.

Difference of Latitude and Departure for 36° (144°, 216°, 324°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	243.5	176.9	361	292.1	212.2	421	340.6	247.5	481	389.1	282.7	541	437.7	318.0
02	244.3	177.5	62	292.9	212.8	22	341.4	248.1	82	390.0	283.3	42	438.5	318.6
03	245.1	178.1	63	293.7	213.4	23	342.2	248.6	83	390.8	283.9	43	439.3	319.1
04	246.0	178.7	64	294.5	214.0	24	343.0	249.2	84	391.6	284.5	44	440.2	319.7
05	246.8	179.3	65	295.3	214.6	25	343.8	249.8	85	392.4	285.1	45	441.0	320.3
06	247.6	179.9	66	296.1	215.1	26	344.7	250.4	86	393.2	285.6	46	441.8	320.9
07	248.4	180.5	67	296.9	215.7	27	345.5	251.0	87	394.0	286.2	47	442.6	321.5
08	249.2	181.1	68	297.7	216.3	28	346.3	251.6	88	394.8	286.8	48	443.4	322.1
09	250.0	181.6	69	298.5	216.9	29	347.1	252.2	89	395.6	287.4	49	444.2	322.7
10	250.8	182.2	70	299.3	217.5	30	347.9	252.8	90	396.4	288.0	50	445.0	323.3
311	251.6	182.8	371	300.2	218.1	431	348.7	253.3	491	397.3	288.6	551	445.8	323.8
12	252.4	183.4	72	301.0	218.7	32	349.5	253.9	92	398.1	289.2	52	446.6	324.4
13	253.2	184.0	73	301.8	219.3	33	350.3	254.5	93	398.9	289.8	53	447.4	325.0
14	254.0	184.6	74	302.6	219.8	34	351.1	255.1	94	399.7	290.3	54	448.2	325.6
15	254.9	185.2	75	303.4	220.4	35	351.9	255.7	95	400.5	290.9	55	449.0	326.2
16	255.7	185.8	76	304.2	221.0	36	352.7	256.3	96	401.3	291.5	56	449.8	326.8
17	256.5	186.4	77	305.0	221.6	37	353.6	256.9	97	402.1	292.1	57	450.7	327.4
18	257.3	186.9	78	305.8	222.2	38	354.4	257.5	98	402.9	292.7	58	451.5	328.0
19	258.1	187.5	79	306.6	222.8	39	355.2	258.0	99	403.7	293.3	59	452.3	328.5
20	258.9	188.1	80	307.4	223.4	40	356.0	258.6	500	404.5	293.9	60	453.1	329.1
321	259.7	188.7	381	308.2	224.0	441	356.8	259.2	501	405.3	294.5	561	453.9	329.7
22	260.5	189.3	82	309.1	224.5	42	357.6	259.8	02	406.1	295.0	62	454.7	330.3
23	261.3	189.9	83	309.9	225.1	43	358.4	260.4	03	407.0	295.6	63	455.5	330.9
24	262.1	190.5	84	310.7	225.7	44	359.2	261.0	04	407.8	296.2	64	456.3	331.5
25	262.9	191.0	85	311.5	226.3	45	360.0	261.6	05	408.6	296.8	65	457.1	332.1
26	263.7	191.6	86	312.3	226.9	46	360.8	262.2	06	409.4	297.4	66	457.9	332.7
27	264.6	192.2	87	313.1	227.5	47	361.6	262.8	07	410.2	298.0	67	458.7	333.3
28	265.4	192.8	88	313.9	228.1	48	362.4	263.3	08	411.0	298.6	68	459.5	333.8
29	266.2	193.4	89	314.7	228.7	49	363.3	263.9	09	411.8	299.2	69	460.3	334.4
30	267.0	194.0	90	315.5	229.2	50	364.1	264.5	10	412.6	299.8	70	461.1	335.0
331	267.8	194.6	391	316.3	229.8	451	364.9	265.1	511	413.4	300.3	571	462.0	335.6
32	268.6	195.2	92	317.1	230.4	52	365.7	265.7	12	414.2	300.9	72	462.8	336.2
33	269.4	195.7	93	318.0	231.0	53	366.5	266.3	13	415.1	301.5	73	463.6	336.8
34	270.2	196.3	94	318.8	231.6	54	367.3	266.9	14	415.9	302.1	74	464.4	337.4
35	271.0	196.9	95	319.6	232.2	55	368.1	267.5	15	416.7	302.7	75	465.2	338.0
36	271.8	197.5	96	320.4	232.8	56	368.9	268.0	16	417.5	303.3	76	466.0	338.5
37	272.6	198.1	97	321.2	233.4	57	369.7	268.6	17	418.3	303.9	77	466.8	339.1
38	273.5	198.7	98	322.0	233.9	58	370.5	269.2	18	419.1	304.4	78	467.6	339.7
39	274.3	199.3	99	322.8	234.5	59	371.3	269.8	19	419.9	305.0	79	468.4	340.3
40	275.1	199.9	400	323.6	235.1	60	372.2	270.4	20	420.7	305.6	80	469.3	340.9
341	275.9	200.4	401	324.4	235.7	461	373.0	271.0	521	421.5	306.2	581	470.1	341.5
42	276.7	201.0	02	325.2	236.3	62	373.8	271.6	22	422.3	306.8	82	470.9	342.1
43	277.5	201.6	03	326.0	236.9	63	374.6	272.2	23	423.1	307.4	83	471.7	342.7
44	278.3	202.2	04	326.9	237.5	64	375.4	272.7	24	423.9	308.0	84	472.5	343.2
45	279.1	202.8	05	327.7	238.1	65	376.2	273.3	25	424.7	308.6	85	473.3	343.8
46	279.9	203.4	06	328.5	238.7	66	377.0	273.9	26	425.5	309.2	86	474.1	344.4
47	280.7	204.0	07	329.3	239.2	67	377.8	274.5	27	426.4	309.7	87	474.9	345.0
48	281.5	204.6	08	330.1	239.8	68	378.6	275.1	28	427.2	310.3	88	475.7	345.6
49	282.4	205.1	09	330.9	240.4	69	379.4	275.7	29	428.0	310.9	89	476.5	346.2
50	283.2	205.7	10	331.7	241.0	70	380.2	276.3	30	428.8	311.5	90	477.3	346.8
351	284.0	206.3	411	332.5	241.6	471	381.1	276.9	531	429.6	312.1	591	478.2	347.4
52	284.8	206.9	12	333.3	242.2	72	381.9	277.4	32	430.4	312.7	92	479.0	347.9
53	285.6	207.5	13	334.1	242.8	73	382.7	278.0	33	431.2	313.3	93	479.8	348.5
54	286.4	208.1	14	334.9	243.4	74	383.5	278.6	34	432.0	313.9	94	480.6	349.1
55	287.2	208.7	15	335.8	243.9	75	384.3	279.2	35	432.9	314.4	95	481.4	349.7
56	288.0	209.3	16	336.6	244.5	76	385.1	279.8	36	433.7	315.0	96	482.2	350.3
57	288.8	209.8	17	337.4	245.1	77	385.9	280.4	37	434.5	315.6	97	483.0	350.9
58	289.6	210.4	18	338.2	245.7	78	386.7	281.0	38	435.3	316.2	98	483.8	351.5
59	290.4	211.0	19	339.0	246.3	79	387.5	281.6	39	436.1	316.8	99	484.6	352.1
60	291.3	211.6	20	339.8	246.9	80	388.3	282.1	40	436.9	317.4	600	485.4	352.7
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

54° (126°, 234°, 306°).

TABLE 2.

Difference of Latitude and Departure for 37° (143°, 217°, 323°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.8	0.6	61	48.7	36.7	121	96.6	72.8	181	144.6	108.9	241	192.5	145.0
2	1.6	1.2	62	49.5	37.3	22	97.4	73.4	82	145.4	109.5	42	193.3	145.6
3	2.4	1.8	63	50.3	37.9	23	98.2	74.0	83	146.2	110.1	43	194.1	146.2
4	3.2	2.4	64	51.1	38.5	24	99.0	74.6	84	146.9	110.7	44	194.9	146.8
5	4.0	3.0	65	51.9	39.1	25	99.8	75.2	85	147.7	111.3	45	195.7	147.4
6	4.8	3.6	66	52.7	39.7	26	100.6	75.8	86	148.5	111.9	46	196.5	148.0
7	5.6	4.2	67	53.5	40.3	27	101.4	76.4	87	149.3	112.5	47	197.3	148.6
8	6.4	4.8	68	54.3	40.9	28	102.2	77.0	88	150.1	113.1	48	198.1	149.3
9	7.2	5.4	69	55.1	41.5	29	103.0	77.6	89	150.9	113.7	49	198.9	149.9
10	8.0	6.0	70	55.9	42.1	30	103.8	78.2	90	151.7	114.3	50	199.7	150.5
11	8.8	6.6	71	56.7	42.7	131	104.6	78.8	191	152.5	114.9	251	200.5	151.1
12	9.6	7.2	72	57.5	43.3	32	105.4	79.4	92	153.3	115.5	52	201.3	151.7
13	10.4	7.8	73	58.3	43.9	33	106.2	80.0	93	154.1	116.2	53	202.1	152.3
14	11.2	8.4	74	59.1	44.5	34	107.0	80.6	94	154.9	116.8	54	202.9	152.9
15	12.0	9.0	75	59.9	45.1	35	107.8	81.2	95	155.7	117.4	55	203.7	153.5
16	12.8	9.6	76	60.7	45.7	36	108.6	81.8	96	156.5	118.0	56	204.5	154.1
17	13.6	10.2	77	61.5	46.3	37	109.4	82.4	97	157.3	118.6	57	205.2	154.7
18	14.4	10.8	78	62.3	46.9	38	110.2	83.1	98	158.1	119.2	58	206.0	155.3
19	15.2	11.4	79	63.1	47.5	39	111.0	83.7	99	158.9	119.8	59	206.8	155.9
20	16.0	12.0	80	63.9	48.1	40	111.8	84.3	200	159.7	120.4	60	207.6	156.5
21	16.8	12.6	81	64.7	48.7	141	112.6	84.9	201	160.5	121.0	261	208.4	157.1
22	17.6	13.2	82	65.5	49.3	42	113.4	85.5	02	161.3	121.6	62	209.2	157.7
23	18.4	13.8	83	66.3	50.0	43	114.2	86.1	03	162.1	122.2	63	210.0	158.3
24	19.2	14.4	84	67.1	50.6	44	115.0	86.7	04	162.9	122.8	64	210.8	158.9
25	20.0	15.0	85	67.9	51.2	45	115.8	87.3	05	163.7	123.4	65	211.6	159.5
26	20.8	15.6	86	68.7	51.8	46	116.6	87.9	06	164.5	124.0	66	212.4	160.1
27	21.6	16.2	87	69.5	52.4	47	117.4	88.5	07	165.3	124.6	67	213.2	160.7
28	22.4	16.9	88	70.3	53.0	48	118.2	89.1	08	166.1	125.2	68	214.0	161.3
29	23.2	17.5	89	71.1	53.6	49	119.0	89.7	09	166.9	125.8	69	214.8	161.9
30	24.0	18.1	90	71.9	54.2	50	119.8	90.3	10	167.7	126.4	70	215.6	162.5
31	24.8	18.7	91	72.7	54.8	151	120.6	90.9	211	168.5	127.0	271	216.4	163.1
32	25.6	19.3	92	73.5	55.4	52	121.4	91.5	12	169.3	127.6	72	217.2	163.7
33	26.4	19.9	93	74.3	56.0	53	122.2	92.1	13	170.1	128.2	73	218.0	164.3
34	27.2	20.5	94	75.1	56.6	54	123.0	92.7	14	170.9	128.8	74	218.8	164.9
35	28.0	21.1	95	75.9	57.2	55	123.8	93.3	15	171.7	129.4	75	219.6	165.5
36	28.8	21.7	96	76.7	57.8	56	124.6	93.9	16	172.5	130.0	76	220.4	166.1
37	29.5	22.3	97	77.5	58.4	57	125.4	94.5	17	173.3	130.6	77	221.2	166.7
38	30.3	22.9	98	78.3	59.0	58	126.2	95.1	18	174.1	131.2	78	222.0	167.3
39	31.1	23.5	99	79.1	59.6	59	127.0	95.7	19	174.9	131.8	79	222.8	167.9
40	31.9	24.1	100	79.9	60.2	60	127.8	96.3	20	175.7	132.4	80	223.6	168.5
41	32.7	24.7	101	80.7	60.8	161	128.6	96.9	221	176.5	133.0	281	224.4	169.1
42	33.5	25.3	02	81.5	61.4	62	129.4	97.5	22	177.3	133.6	82	225.2	169.7
43	34.3	25.9	03	82.3	62.0	63	130.2	98.1	23	178.1	134.2	83	226.0	170.3
44	35.1	26.5	04	83.1	62.6	64	131.0	98.7	24	178.9	134.8	84	226.8	170.9
45	35.9	27.1	05	83.9	63.2	65	131.8	99.3	25	179.7	135.4	85	227.6	171.5
46	36.7	27.7	06	84.7	63.8	66	132.6	99.9	26	180.5	136.0	86	228.4	172.1
47	37.5	28.3	07	85.5	64.4	67	133.4	100.5	27	181.3	136.6	87	229.2	172.7
48	38.3	28.9	08	86.3	65.0	68	134.2	101.1	28	182.1	137.2	88	230.0	173.3
49	39.1	29.5	09	87.1	65.6	69	135.0	101.7	29	182.9	137.8	89	230.8	173.9
50	39.9	30.1	10	87.8	66.2	70	135.8	102.3	30	183.7	138.4	90	231.6	174.5
51	40.7	30.7	111	88.6	66.8	171	136.6	102.9	231	184.5	139.0	291	232.4	175.1
52	41.5	31.3	12	89.4	67.4	72	137.4	103.5	32	185.3	139.6	92	233.2	175.7
53	42.3	31.9	13	90.2	68.0	73	138.2	104.1	33	186.1	140.2	93	234.0	176.3
54	43.1	32.5	14	91.0	68.6	74	139.0	104.7	34	186.9	140.8	94	234.8	176.9
55	43.9	33.1	15	91.8	69.2	75	139.8	105.3	35	187.7	141.4	95	235.6	177.5
56	44.7	33.7	16	92.6	69.8	76	140.6	105.9	36	188.5	142.0	96	236.4	178.1
57	45.5	34.3	17	93.4	70.4	77	141.4	106.5	37	189.3	142.6	97	237.2	178.7
58	46.3	34.9	18	94.2	71.0	78	142.2	107.1	38	190.1	143.2	98	238.0	179.3
59	47.1	35.5	19	95.0	71.6	79	143.0	107.7	39	190.9	143.8	99	238.8	179.9
60	47.9	36.1	20	95.8	72.2	80	143.8	108.3	40	191.7	144.4	300	239.6	180.5
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

53° (127°, 233°, 307°).

TABLE 2.

Difference of Latitude and Departure for 37° (143°, 217°, 323°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	240.4	181.1	361	288.3	217.3	421	336.2	253.4	481	384.1	289.5	541	432.0	325.6
02	241.2	181.7	62	289.1	217.9	22	337.0	254.0	82	384.9	290.0	42	432.8	326.2
03	242.0	182.4	63	289.9	218.5	23	337.8	254.6	83	385.7	290.6	43	433.6	326.8
04	242.7	183.0	64	290.7	219.1	24	338.6	255.2	84	386.5	291.2	44	434.4	327.3
05	243.5	183.6	65	291.5	219.7	25	339.4	255.8	85	387.3	291.8	45	435.2	327.9
06	244.3	184.2	66	292.3	220.3	26	340.2	256.4	86	388.1	292.4	46	436.0	328.5
07	245.1	184.8	67	293.1	220.9	27	341.0	257.0	87	388.9	293.0	47	436.8	329.1
08	245.9	185.4	68	293.9	221.5	28	341.8	257.6	88	389.7	293.6	48	437.6	329.7
09	246.7	186.0	69	294.7	222.1	29	342.6	258.2	89	390.5	294.2	49	438.4	330.3
10	247.5	186.6	70	295.5	222.7	30	343.4	258.8	90	391.3	294.8	50	439.2	330.9
311	248.3	187.2	371	296.3	223.3	431	344.2	259.4	491	392.1	295.4	551	440.0	331.5
12	249.1	187.8	72	297.1	223.9	32	345.0	260.0	92	392.9	296.0	52	440.8	332.1
13	249.9	188.4	73	297.9	224.5	33	345.8	260.6	93	393.7	296.6	53	441.6	332.7
14	250.7	189.0	74	298.7	225.1	34	346.6	261.2	94	394.5	297.2	54	442.4	333.3
15	251.5	189.6	75	299.5	225.7	35	347.4	261.8	95	395.3	297.8	55	443.2	333.9
16	252.3	190.2	76	300.3	226.3	36	348.2	262.4	96	396.1	298.5	56	444.0	334.6
17	253.1	190.8	77	301.1	226.9	37	349.0	263.0	97	396.9	299.1	57	444.8	235.2
18	253.9	191.4	78	301.8	227.5	38	349.8	263.6	98	397.7	399.7	58	445.6	335.8
19	254.7	192.0	79	302.6	228.1	39	350.6	264.2	99	398.5	300.3	59	446.4	336.4
20	255.5	192.6	80	303.4	228.7	40	351.4	264.8	500	399.3	300.9	60	447.2	337.0
321	256.3	193.2	381	304.2	229.3	441	352.2	265.4	501	400.1	301.5	561	448.0	337.6
22	257.1	193.8	82	305.0	229.9	42	353.0	266.0	02	400.9	302.1	62	448.8	338.2
23	257.9	194.4	83	305.8	230.5	43	353.8	266.6	03	401.7	302.7	63	449.6	338.8
24	258.7	195.0	84	306.6	231.1	44	354.6	267.2	04	402.5	303.3	64	450.4	339.4
25	259.5	195.6	85	307.4	231.7	45	355.4	267.8	05	403.3	303.9	65	451.2	340.0
26	260.3	196.2	86	308.2	232.3	46	356.2	268.4	06	404.1	304.5	66	452.0	340.6
27	261.1	196.8	87	309.0	232.9	47	357.0	269.0	07	404.9	305.1	67	452.8	341.2
28	261.9	197.4	88	309.8	233.5	48	357.8	269.6	08	405.7	305.7	68	453.6	341.8
29	262.7	198.0	89	310.6	234.1	49	358.6	270.2	09	406.5	306.3	69	454.4	342.4
30	263.5	198.6	90	311.4	234.7	50	359.4	270.8	10	407.3	306.9	70	455.2	343.0
331	264.3	199.2	391	312.2	235.3	451	360.1	271.4	511	408.1	307.5	571	456.0	343.6
32	265.1	199.8	92	313.0	235.9	52	360.9	272.0	12	408.9	308.2	72	456.8	344.3
33	265.9	200.4	93	313.8	236.5	53	361.7	272.6	13	409.7	308.8	73	457.6	344.9
34	266.7	201.0	94	314.6	237.1	54	362.5	273.2	14	410.5	309.4	74	458.4	345.5
35	267.5	201.6	95	315.4	237.7	55	363.3	273.8	15	411.3	310.0	75	459.2	346.1
36	268.3	202.2	96	316.2	238.3	56	364.1	274.4	16	412.1	310.6	76	460.0	346.7
37	269.1	202.8	97	317.0	238.9	57	364.9	275.0	17	412.9	311.2	77	460.8	347.3
38	269.9	203.4	98	317.8	239.5	58	365.7	275.6	18	413.7	311.8	78	461.6	347.9
39	270.7	204.0	99	318.6	240.1	59	366.5	276.2	19	414.5	312.4	79	462.4	348.5
40	271.5	204.6	400	319.4	240.7	60	367.3	276.8	20	415.3	313.0	80	463.2	349.1
341	272.3	205.2	401	320.2	241.3	461	368.1	277.4	521	416.1	313.6	581	464.0	349.7
42	273.1	205.8	02	321.0	241.9	62	368.9	278.0	22	416.9	314.2	82	464.8	350.3
43	273.9	206.4	03	321.8	242.5	63	369.7	278.6	23	417.7	314.8	83	465.6	350.9
44	274.7	207.0	04	322.6	243.1	64	370.5	279.2	24	418.5	315.4	84	466.4	351.5
45	275.5	207.6	05	323.4	243.7	65	371.3	279.8	25	419.3	316.0	85	467.2	352.1
46	276.3	208.2	06	324.2	244.3	66	372.1	280.4	26	420.1	316.6	86	468.0	352.7
47	277.1	208.8	07	325.0	244.9	67	372.9	281.0	27	420.9	317.2	87	468.8	353.3
48	277.9	209.4	08	325.8	245.5	68	373.7	281.6	28	421.7	317.8	88	469.6	353.9
49	278.7	210.0	09	326.6	246.1	69	374.5	282.3	29	422.5	318.4	89	470.4	354.5
50	279.5	210.6	10	327.4	246.7	70	375.3	282.9	30	423.3	319.0	90	471.2	355.1
351	280.3	211.2	411	328.2	247.3	471	376.1	283.5	531	424.1	319.6	591	472.0	355.7
52	281.1	211.8	12	329.0	247.9	72	376.9	284.1	32	424.9	320.2	92	472.8	356.3
53	281.9	212.4	13	329.8	248.5	73	377.7	284.7	33	425.7	320.8	93	473.6	356.9
54	282.7	213.0	14	330.6	249.2	74	378.5	285.3	34	426.5	321.4	94	474.4	357.5
55	283.5	213.6	15	331.4	249.8	75	379.3	285.9	35	427.3	322.0	95	475.2	358.1
56	284.3	214.2	16	332.2	250.4	76	380.1	286.5	36	428.1	322.6	96	476.0	358.7
57	285.1	214.8	17	333.0	251.0	77	380.9	287.1	37	428.9	323.2	97	476.8	359.3
58	285.9	215.4	18	333.8	251.6	78	381.7	287.7	38	429.7	323.8	98	477.6	359.9
59	286.7	216.1	19	334.6	252.2	79	382.5	288.3	39	430.5	324.4	99	478.4	360.5
60	287.5	216.7	20	335.4	252.8	80	383.3	288.9	40	431.3	325.0	600	479.2	361.1
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

53° (127°, 233°, 307°).

TABLE 2.

Difference of Latitude and Departure for 38° (142°, 218°, 322°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.8	0.6	61	48.1	37.6	121	95.3	74.5	181	142.6	111.4	241	189.9	148.4
2	1.6	1.2	62	48.9	38.2	22	96.1	75.1	82	143.4	112.1	42	190.7	149.0
3	2.4	1.8	63	49.6	38.8	23	96.9	75.7	83	144.2	112.7	43	191.5	149.6
4	3.2	2.5	64	50.4	39.4	24	97.7	76.3	84	145.0	113.3	44	192.3	150.2
5	3.9	3.1	65	51.2	40.0	25	98.5	77.0	85	145.8	113.9	45	193.1	150.8
6	4.7	3.7	66	52.0	40.6	26	99.3	77.6	86	146.6	114.5	46	193.9	151.5
7	5.5	4.3	67	52.8	41.2	27	100.1	78.2	87	147.4	115.1	47	194.6	152.1
8	6.3	4.9	68	53.6	41.9	28	100.9	78.8	88	148.1	115.7	48	195.4	152.7
9	7.1	5.5	69	54.4	42.5	29	101.7	79.4	89	148.9	116.4	49	196.2	153.3
10	7.9	6.2	70	55.2	43.1	30	102.4	80.0	90	149.7	117.0	50	197.0	153.9
11	8.7	6.8	71	55.9	43.7	131	103.2	80.7	191	150.5	117.6	251	197.8	154.5
12	9.5	7.4	72	56.7	44.3	32	104.0	81.3	92	151.3	118.2	52	198.6	155.1
13	10.2	8.0	73	57.5	44.9	33	104.8	81.9	93	152.1	118.8	53	199.4	155.8
14	11.0	8.6	74	58.3	45.6	34	105.6	82.5	94	152.9	119.4	54	200.2	156.4
15	11.8	9.2	75	59.1	46.2	35	106.4	83.1	95	153.7	120.1	55	200.9	157.0
16	12.6	9.9	76	59.9	46.8	36	107.2	83.7	96	154.5	120.7	56	201.7	157.6
17	13.4	10.5	77	60.7	47.4	37	108.0	84.3	97	155.2	121.3	57	202.5	158.2
18	14.2	11.1	78	61.5	48.0	38	108.7	85.0	98	156.0	121.9	58	203.3	158.8
19	15.0	11.7	79	62.3	48.6	39	109.5	85.6	99	156.8	122.5	59	204.1	159.5
20	15.8	12.3	80	63.0	49.3	40	110.3	86.2	200	157.6	123.1	60	204.9	160.1
21	16.5	12.9	81	63.8	49.9	141	111.1	86.8	201	158.4	123.7	261	205.7	160.7
22	17.3	13.5	82	64.6	50.5	42	111.9	87.4	02	159.2	124.4	62	206.5	161.3
23	18.1	14.2	83	65.4	51.1	43	112.7	88.0	03	160.0	125.0	63	207.2	161.9
24	18.9	14.8	84	66.2	51.7	44	113.5	88.7	04	160.8	125.6	64	208.0	162.5
25	19.7	15.4	85	67.0	52.3	45	114.3	89.3	05	161.5	126.2	65	208.8	163.2
26	20.5	16.0	86	67.8	52.9	46	115.0	89.9	06	162.3	126.8	66	209.6	163.8
27	21.3	16.6	87	68.6	53.6	47	115.8	90.5	07	163.1	127.4	67	210.4	164.4
28	22.1	17.2	88	69.3	54.2	48	116.6	91.1	08	163.9	128.1	68	211.2	165.0
29	22.9	17.9	89	70.1	54.8	49	117.4	91.7	09	164.7	128.7	69	212.0	165.6
30	23.6	18.5	90	70.9	55.4	50	118.2	92.3	10	165.5	129.3	70	212.8	166.2
31	24.4	19.1	91	71.7	56.0	151	119.0	93.0	211	166.3	129.9	271	213.6	166.8
32	25.2	19.7	92	72.5	56.6	52	119.8	93.6	12	167.1	130.5	72	214.3	167.5
33	26.0	20.3	93	73.3	57.3	53	120.6	94.2	13	167.8	131.1	73	215.1	168.1
34	26.8	20.9	94	74.1	57.9	54	121.4	94.8	14	168.6	131.8	74	215.9	168.7
35	27.6	21.5	95	74.9	58.5	55	122.1	95.4	15	169.4	132.4	75	216.7	169.3
36	28.4	22.2	96	75.6	59.1	56	122.9	96.0	16	170.2	133.0	76	217.5	169.9
37	29.2	22.8	97	76.4	59.7	57	123.7	96.7	17	171.0	133.6	77	218.3	170.5
38	29.9	23.4	98	77.2	60.3	58	124.5	97.3	18	171.8	134.2	78	219.1	171.2
39	30.7	24.0	99	78.0	61.0	59	125.3	97.9	19	172.6	134.8	79	219.9	171.8
40	31.5	24.6	100	78.8	61.6	60	126.1	98.5	20	173.4	135.4	80	220.6	172.4
41	32.3	25.2	101	79.6	62.2	161	126.9	99.1	221	174.2	136.1	281	221.4	173.0
42	33.1	25.9	02	80.4	62.8	62	127.7	99.7	22	174.9	136.7	82	222.2	173.6
43	33.9	26.5	03	81.2	63.4	63	128.4	100.4	23	175.7	137.3	83	223.0	174.2
44	34.7	27.1	04	82.0	64.0	64	129.2	101.0	24	176.5	137.9	84	223.8	174.8
45	35.5	27.7	05	82.7	64.6	65	130.0	101.6	25	177.3	138.5	85	224.6	175.5
46	36.2	28.3	06	83.5	65.3	66	130.8	102.2	26	178.1	139.1	86	225.4	176.1
47	37.0	28.9	07	84.3	65.9	67	131.6	102.8	27	178.9	139.8	87	226.2	176.7
48	37.8	29.6	08	85.1	66.5	68	132.4	103.4	28	179.7	140.4	88	226.9	177.3
49	38.6	30.2	09	85.9	67.1	69	133.2	104.0	29	180.5	141.0	89	227.7	177.9
50	39.4	30.8	10	86.7	67.7	70	134.0	104.7	30	181.2	141.6	90	228.5	178.5
51	40.2	31.4	111	87.5	68.3	171	134.7	105.3	231	182.0	142.2	291	229.3	179.2
52	41.0	32.0	12	88.3	69.0	72	135.5	105.9	32	182.8	142.8	92	230.1	179.8
53	41.8	32.6	13	89.0	69.6	73	136.3	106.5	33	183.6	143.4	93	230.9	180.4
54	42.6	33.2	14	89.8	70.2	74	137.1	107.1	34	184.4	144.1	94	231.7	181.0
55	43.3	33.9	15	90.6	70.8	75	137.9	107.7	35	185.2	144.7	95	232.5	181.6
56	44.1	34.5	16	91.4	71.4	76	138.7	108.4	36	186.0	145.3	96	233.3	182.2
57	44.9	35.1	17	92.2	72.0	77	139.5	109.0	37	186.8	145.9	97	234.0	182.9
58	45.7	35.7	18	93.0	72.6	78	140.3	109.6	38	187.5	146.5	98	234.8	183.5
59	46.5	36.3	19	93.8	73.3	79	141.1	110.2	39	188.3	147.1	99	235.6	184.1
60	47.3	36.9	20	94.6	73.9	80	141.8	110.8	40	189.1	147.8	300	236.4	184.7
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

52° (128°, 232°, 308°).

TABLE 2.

Difference of Latitude and Departure for 38° (142°, 218°, 322°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	237.2	185.3	361	284.5	222.3	421	331.8	259.2	481	379.0	296.2	541	426.3	333.1
02	238.0	185.9	62	285.3	222.9	22	332.5	259.8	82	379.8	296.8	42	427.1	333.7
03	238.8	186.6	63	286.0	223.5	23	333.3	260.4	83	380.6	297.4	43	427.9	334.3
04	239.6	187.2	64	286.8	224.1	24	334.1	261.0	84	381.4	298.0	44	428.7	335.0
05	240.3	187.8	65	287.6	224.7	25	334.9	261.7	85	382.2	298.6	45	429.5	335.6
06	241.1	188.4	66	288.4	225.3	26	335.7	262.3	86	383.0	299.2	46	430.3	336.2
07	241.9	189.0	67	289.2	226.0	27	336.5	262.9	87	383.8	299.8	47	431.0	336.8
08	242.7	189.6	68	290.0	226.6	28	337.3	263.5	88	384.5	300.4	48	431.8	337.4
09	243.5	190.2	69	290.8	227.2	29	338.1	264.1	89	385.3	301.1	49	432.6	338.0
10	244.3	190.9	70	291.6	227.8	30	338.8	264.7	90	386.1	301.7	50	433.4	338.6
311	245.1	191.5	371	292.4	228.4	431	339.6	265.4	491	386.9	302.3	551	434.2	339.3
12	245.9	192.1	72	293.1	229.0	32	340.4	266.0	92	387.7	302.9	52	435.0	339.9
13	246.6	192.7	73	293.9	229.6	33	341.2	266.6	93	388.5	303.5	53	435.8	340.5
14	247.4	193.3	74	294.7	230.3	34	342.0	267.2	94	389.3	304.2	54	436.6	341.1
15	248.2	193.9	75	295.5	230.9	35	342.8	267.8	95	390.1	304.8	55	437.4	341.7
16	249.0	194.6	76	296.3	231.5	36	343.6	268.4	96	390.9	305.4	56	438.1	342.3
17	249.8	195.2	77	297.1	232.1	37	344.4	269.1	97	391.6	306.0	57	438.9	343.0
18	250.6	195.8	78	297.9	232.7	38	345.2	269.7	98	392.4	306.6	58	439.7	343.6
19	251.4	196.4	79	298.7	233.3	39	345.9	270.3	99	393.2	307.2	59	440.5	344.2
20	252.2	197.0	80	299.4	234.0	40	346.7	270.9	500	394.0	307.8	60	441.3	344.8
321	253.0	197.6	381	300.2	234.6	441	347.5	271.5	501	394.8	308.4	561	442.1	345.4
22	253.7	198.2	82	301.0	235.2	42	348.3	272.1	02	395.6	309.1	62	442.9	346.0
23	254.5	198.9	83	301.8	235.8	43	349.1	272.7	03	396.4	309.7	63	443.7	346.6
24	255.3	199.5	84	302.6	236.4	44	349.9	273.4	04	397.2	310.3	64	444.4	347.2
25	256.1	200.1	85	303.4	237.0	45	350.7	274.0	05	397.9	310.9	65	445.2	347.8
26	256.9	200.7	86	304.2	237.7	46	351.5	274.6	06	398.7	311.6	66	446.0	348.5
27	257.7	201.3	87	305.0	238.3	47	352.2	275.2	07	399.5	312.2	67	446.8	349.1
28	258.5	201.9	88	305.7	238.9	48	353.0	275.8	08	400.3	312.8	68	447.6	349.7
29	259.3	202.6	89	306.5	239.5	49	353.8	276.4	09	401.1	313.4	69	448.4	350.3
30	260.0	203.2	90	307.3	240.1	50	354.6	277.1	10	401.9	314.0	70	449.2	350.9
331	260.8	203.8	391	308.1	240.7	451	355.4	277.7	511	402.7	314.6	571	450.0	351.6
32	261.6	204.4	92	308.9	241.3	52	356.2	278.3	12	403.5	315.2	72	450.7	352.2
33	262.4	205.0	93	309.7	242.0	53	357.0	278.9	13	404.2	315.8	73	451.5	352.8
34	263.2	205.6	94	310.5	242.6	54	357.8	279.5	14	405.0	316.4	74	452.3	353.4
35	264.0	206.3	95	311.3	243.2	55	358.5	280.1	15	405.8	317.1	75	453.1	354.0
36	264.8	206.9	96	312.1	243.8	56	359.3	280.7	16	406.6	317.7	76	453.9	354.6
37	265.6	207.5	97	312.8	244.4	57	360.1	281.4	17	407.4	318.3	77	454.7	355.2
38	266.3	208.1	98	313.6	245.0	58	360.9	282.0	18	408.2	318.9	78	455.5	355.8
39	267.1	208.7	99	314.4	245.7	59	361.7	282.6	19	409.0	319.5	79	456.3	356.4
40	267.9	209.3	400	315.2	246.3	60	362.5	283.2	20	409.8	320.2	80	457.1	357.1
341	268.7	209.9	401	316.0	246.9	461	363.3	283.8	521	410.6	320.8	581	457.8	357.7
42	269.5	210.6	02	316.8	247.5	62	364.1	284.4	22	411.3	321.4	82	458.6	358.3
43	270.3	211.2	03	317.6	248.1	63	364.9	285.1	23	412.1	322.0	83	459.4	358.9
44	271.1	211.8	04	318.4	248.7	64	365.6	285.7	24	412.9	322.6	84	460.2	359.5
45	271.9	212.4	05	319.1	249.3	65	366.4	286.3	25	413.7	323.2	85	461.0	360.2
46	272.7	213.0	06	319.9	250.0	66	367.2	286.9	26	414.5	323.8	86	461.8	360.8
47	273.4	213.6	07	320.7	250.6	67	368.0	287.5	27	415.3	324.5	87	462.6	361.4
48	274.2	214.3	08	321.5	251.2	68	368.8	288.1	28	416.1	325.1	88	463.3	362.0
49	275.0	214.9	09	322.3	251.8	69	369.6	288.7	29	416.9	325.7	89	464.1	362.6
50	275.8	215.5	10	323.1	252.4	70	370.4	289.3	30	417.6	326.3	90	464.9	363.2
351	276.6	216.1	411	323.9	253.0	471	371.2	290.0	531	418.4	326.9	591	465.7	363.8
52	277.4	216.7	12	324.7	253.7	72	371.9	290.6	32	419.2	327.5	92	466.5	364.4
53	278.2	217.3	13	325.5	254.3	73	372.7	291.2	33	420.0	328.2	93	467.3	365.1
54	279.0	218.0	14	326.2	254.9	74	373.5	291.8	34	420.8	328.8	94	468.1	365.7
55	279.7	218.6	15	327.0	255.5	75	374.3	292.4	35	421.6	329.4	95	468.9	366.3
56	280.5	219.2	16	327.8	256.1	76	375.1	293.1	36	422.4	330.0	96	469.7	366.9
57	281.3	219.8	17	328.6	256.7	77	375.9	293.7	37	423.2	330.6	97	470.5	367.5
58	282.1	220.4	18	329.4	257.4	78	376.7	294.3	38	424.0	331.2	98	471.2	368.1
59	282.9	221.0	19	330.2	258.0	79	377.5	294.9	39	424.7	331.8	99	472.0	368.7
60	283.7	221.6	20	331.0	258.6	80	378.2	295.5	40	425.5	332.5	600	472.8	369.4
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

52° (128°, 232°, 308°).

TABLE 2.

Difference of Latitude and Departure for 39° (141°, 219°, 321°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.8	0.6	61	47.4	38.4	121	94.0	76.1	181	140.7	113.9	241	187.3	151.7
2	1.6	1.3	62	48.2	39.0	22	94.8	76.8	82	141.4	114.5	42	188.1	152.3
3	2.3	1.9	63	49.0	39.6	23	95.6	77.4	83	142.2	115.2	43	188.8	152.9
4	3.1	2.5	64	49.7	40.3	24	96.4	78.0	84	143.0	115.8	44	189.6	153.6
5	3.9	3.1	65	50.5	40.9	25	97.1	78.7	85	143.8	116.4	45	190.4	154.2
6	4.7	3.8	66	51.3	41.5	26	97.9	79.3	86	144.5	117.1	46	191.2	154.8
7	5.4	4.4	67	52.1	42.2	27	98.7	79.9	87	145.3	117.7	47	192.0	155.4
8	6.2	5.0	68	52.8	42.8	28	99.5	80.6	88	146.1	118.3	48	192.7	156.1
9	7.0	5.7	69	53.6	43.4	29	100.3	81.2	89	146.9	118.9	49	193.5	156.7
10	7.8	6.3	70	54.4	44.1	30	101.0	81.8	90	147.7	119.6	50	194.3	157.3
11	8.5	6.9	71	55.2	44.7	131	101.8	82.4	191	148.4	120.2	251	195.1	158.0
12	9.3	7.6	72	56.0	45.3	32	102.6	83.1	92	149.2	120.8	52	195.8	158.6
13	10.1	8.2	73	56.7	45.9	33	103.4	83.7	93	150.0	121.5	53	196.6	159.2
14	10.9	8.8	74	57.5	46.6	34	104.1	84.3	94	150.8	122.1	54	197.4	159.8
15	11.7	9.4	75	58.3	47.2	35	104.9	85.0	95	151.5	122.7	55	198.2	160.5
16	12.4	10.1	76	59.1	47.8	36	105.7	85.6	96	152.3	123.3	56	198.9	161.1
17	13.2	10.7	77	59.8	48.5	37	106.5	86.2	97	153.1	124.0	57	199.7	161.7
18	14.0	11.3	78	60.6	49.1	38	107.2	86.8	98	153.9	124.6	58	200.5	162.4
19	14.8	12.0	79	61.4	49.7	39	108.0	87.5	99	154.7	125.2	59	201.3	163.0
20	15.5	12.6	80	62.2	50.3	40	108.8	88.1	200	155.4	125.9	60	202.1	163.6
21	16.3	13.2	81	62.9	51.0	141	109.6	88.7	201	156.2	126.5	261	202.8	164.3
22	17.1	13.8	82	63.7	51.6	42	110.4	89.4	02	157.0	127.1	62	203.6	164.9
23	17.9	14.5	83	64.5	52.2	43	111.1	90.0	03	157.8	127.8	63	204.4	165.5
24	18.7	15.1	84	65.3	52.9	44	111.9	90.6	04	158.5	128.4	64	205.2	166.1
25	19.4	15.7	85	66.1	53.5	45	112.7	91.3	05	159.3	129.0	65	205.9	166.8
26	20.2	16.4	86	66.8	54.1	46	113.5	91.9	06	160.1	129.6	66	206.7	167.4
27	21.0	17.0	87	67.6	54.8	47	114.2	92.5	07	160.9	130.3	67	207.5	168.0
28	21.8	17.6	88	68.4	55.4	48	115.0	93.1	08	161.6	130.9	68	208.3	168.7
29	22.5	18.3	89	69.2	56.0	49	115.8	93.8	09	162.4	131.5	69	209.1	169.3
30	23.3	18.9	90	69.9	56.6	50	116.6	94.4	10	163.2	132.2	70	209.8	169.9
31	24.1	19.5	91	70.7	57.3	151	117.3	95.0	211	164.0	132.8	271	210.6	170.5
32	24.9	20.1	92	71.5	57.9	52	118.1	95.7	12	164.8	133.4	72	211.4	171.2
33	25.6	20.8	93	72.3	58.5	53	118.9	96.3	13	165.5	134.0	73	212.2	171.8
34	26.4	21.4	94	73.1	59.2	54	119.7	96.9	14	166.3	134.7	74	212.9	172.4
35	27.2	22.0	95	73.8	59.8	55	120.5	97.5	15	167.1	135.3	75	213.7	173.1
36	28.0	22.7	96	74.6	60.4	56	121.2	98.2	16	167.9	135.9	76	214.5	173.7
37	28.8	23.3	97	75.4	61.0	57	122.0	98.8	17	168.6	136.6	77	215.3	174.3
38	29.5	23.9	98	76.2	61.7	58	122.8	99.4	18	169.4	137.2	78	216.0	175.0
39	30.3	24.5	99	76.9	62.3	59	123.6	100.1	19	170.2	137.8	79	216.8	175.6
40	31.1	25.2	100	77.7	62.9	60	124.3	100.7	20	171.0	138.5	80	217.6	176.2
41	31.9	25.8	101	78.5	63.6	161	125.1	101.3	221	171.7	139.1	281	218.4	176.8
42	32.6	26.4	02	79.3	64.2	62	125.9	101.9	22	172.5	139.7	82	219.2	177.5
43	33.4	27.1	03	80.0	64.8	63	126.7	102.6	23	173.3	140.3	83	219.9	178.1
44	34.2	27.7	04	80.8	65.4	64	127.5	103.2	24	174.1	141.0	84	220.7	178.7
45	35.0	28.3	05	81.6	66.1	65	128.2	103.8	25	174.9	141.6	85	221.5	179.4
46	35.7	28.9	06	82.4	66.7	66	129.0	104.5	26	175.6	142.2	86	222.3	180.0
47	36.5	29.6	07	83.2	67.3	67	129.8	105.1	27	176.4	142.9	87	223.0	180.6
48	37.3	30.2	08	83.9	68.0	68	130.6	105.7	28	177.2	143.5	88	223.8	181.2
49	38.1	30.8	09	84.7	68.6	69	131.3	106.4	29	178.0	144.1	89	224.6	181.9
50	38.9	31.5	10	85.5	69.2	70	132.1	107.0	30	178.7	144.7	90	225.4	182.5
51	39.6	32.1	111	86.3	69.9	171	132.9	107.6	231	179.5	145.4	291	226.1	183.1
52	40.4	32.7	12	87.0	70.5	72	133.7	108.2	32	180.3	146.0	92	226.9	183.8
53	41.2	33.4	13	87.8	71.1	73	134.4	108.9	33	181.1	146.6	93	227.7	184.4
54	42.0	34.0	14	88.6	71.7	74	135.2	109.5	34	181.9	147.3	94	228.5	185.0
55	42.7	34.6	15	89.4	72.4	75	136.0	110.1	35	182.6	147.9	95	229.3	185.6
56	43.5	35.2	16	90.1	73.0	76	136.8	110.8	36	183.4	148.5	96	230.0	186.3
57	44.3	35.9	17	90.9	73.6	77	137.6	111.4	37	184.2	149.1	97	230.8	186.9
58	45.1	36.5	18	91.7	74.3	78	138.3	112.0	38	185.0	149.8	98	231.6	187.5
59	45.9	37.1	19	92.5	74.9	79	139.1	112.6	39	185.7	150.4	99	232.4	188.2
60	46.6	37.8	20	93.3	75.5	80	139.9	113.3	40	186.5	151.0	300	233.1	188.8
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

51° (129°, 231°, 309°).

TABLE 2.

Difference of Latitude and Departure for 39° (141°, 219°, 321°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	233.9	189.4	361	280.6	227.1	421	327.2	264.9	481	373.8	302.6	541	420.4	340.4
02	234.7	190.0	62	281.3	227.8	22	328.0	265.5	82	374.6	303.3	42	421.2	341.0
03	235.5	190.6	63	282.1	228.4	23	328.7	266.2	83	375.4	303.9	43	422.0	341.7
04	236.3	191.3	64	282.9	229.0	24	329.5	266.8	84	376.1	304.5	44	422.7	342.3
05	237.0	191.9	65	283.7	229.7	25	330.3	267.4	85	376.9	305.2	45	423.5	342.9
06	237.8	192.5	66	284.4	230.3	26	331.1	268.0	86	377.7	305.8	46	424.3	343.6
07	238.6	193.2	67	285.2	230.9	27	331.9	268.7	87	378.5	306.4	47	425.1	344.2
08	239.4	193.8	68	286.0	231.5	28	332.6	269.3	88	379.3	307.1	48	425.9	344.8
09	240.1	194.4	69	286.8	232.2	29	333.4	269.9	89	380.0	307.7	49	426.6	345.5
10	240.9	195.0	70	287.6	232.8	30	334.2	270.6	90	380.8	308.3	50	427.4	346.1
311	241.7	195.7	371	288.3	233.4	431	335.0	271.2	491	381.6	308.9	551	428.2	346.7
12	242.5	196.3	72	289.1	234.1	32	335.7	271.8	92	382.4	309.6	52	429.0	347.4
13	243.3	196.9	73	289.9	234.7	33	336.5	272.5	93	383.1	310.2	53	429.7	348.0
14	244.0	197.6	74	290.7	235.3	34	337.3	273.1	94	383.9	310.8	54	430.5	348.6
15	244.8	198.2	75	291.4	236.0	35	338.1	273.7	95	384.7	311.5	55	431.3	349.2
16	245.6	198.8	76	292.2	236.6	36	338.8	274.3	96	385.5	312.1	56	432.1	349.9
17	246.4	199.5	77	293.0	237.2	37	339.6	275.0	97	386.2	312.7	57	432.8	350.5
18	247.1	200.1	78	293.8	237.8	38	340.4	275.6	98	387.0	313.3	58	433.6	351.1
19	247.9	200.7	79	294.5	238.5	39	341.2	276.2	99	387.8	314.0	59	434.4	351.7
20	248.7	201.3	80	295.3	239.1	40	342.0	276.9	500	388.6	314.7	60	435.2	352.4
321	249.5	202.0	381	296.1	239.7	441	342.7	277.5	501	389.4	315.3	561	435.9	353.0
22	250.3	202.6	82	296.9	240.4	42	343.5	278.1	02	390.1	315.9	62	436.7	353.6
23	251.0	203.2	83	297.7	241.0	43	344.3	278.7	03	390.9	316.5	63	437.5	354.3
24	251.8	203.9	84	298.4	241.6	44	345.1	279.4	04	391.7	317.1	64	438.3	354.9
25	252.6	204.5	85	299.2	242.2	45	345.8	280.0	05	392.5	317.8	65	439.1	355.5
26	253.4	205.1	86	300.0	242.9	46	346.6	280.6	06	393.2	318.4	66	439.8	356.2
27	254.1	205.7	87	300.8	243.5	47	347.4	281.3	07	394.0	319.0	67	440.6	356.8
28	254.9	206.4	88	301.5	244.1	48	348.2	281.9	08	394.8	319.6	68	441.4	357.4
29	255.7	207.0	89	302.3	244.8	49	349.0	282.5	09	395.6	320.3	69	442.2	358.1
30	256.5	207.6	90	303.1	245.4	50	349.7	283.2	10	396.3	320.9	70	443.0	358.7
331	257.2	208.3	391	303.9	246.0	451	350.5	283.8	511	397.1	321.6	571	443.7	359.3
32	258.0	208.9	92	304.7	246.7	52	351.3	284.4	12	397.9	322.2	72	444.5	359.9
33	258.8	209.5	93	305.4	247.3	53	352.1	285.0	13	398.7	322.8	73	445.3	360.6
34	259.6	210.2	94	306.2	247.9	54	352.8	285.7	14	399.4	323.4	74	446.1	361.2
35	260.4	210.8	95	307.0	248.5	55	353.6	286.3	15	400.2	324.1	75	446.9	361.8
36	261.1	211.4	96	307.8	249.2	56	354.4	286.9	16	401.0	324.7	76	447.6	362.4
37	261.9	212.0	97	308.5	249.8	57	355.2	287.6	17	401.8	325.3	77	448.4	363.1
38	262.7	212.7	98	309.3	250.4	58	355.9	288.2	18	402.5	325.9	78	449.2	363.7
39	263.5	213.3	99	310.1	251.1	59	356.7	288.8	19	403.3	326.6	79	450.0	364.3
40	264.2	213.9	400	310.9	251.7	60	357.5	289.4	20	404.1	327.2	80	450.7	365.0
341	265.0	214.6	401	311.6	252.3	461	358.3	290.1	521	404.9	327.8	581	451.5	365.6
42	265.8	215.2	02	312.4	252.9	62	359.1	290.7	22	405.7	328.5	82	452.3	366.2
43	266.6	215.8	03	313.2	253.6	63	359.8	291.3	23	406.4	329.1	83	453.1	366.9
44	267.3	216.4	04	314.0	254.2	64	360.6	292.0	24	407.2	329.7	84	453.9	367.5
45	268.1	217.1	05	314.8	254.8	65	361.4	292.6	25	408.0	330.4	85	454.6	368.1
46	268.9	217.7	06	315.5	255.5	66	362.2	293.2	26	408.8	331.0	86	455.4	368.8
47	269.7	218.3	07	316.3	256.1	67	362.9	293.8	27	409.5	331.6	87	456.2	369.4
48	270.5	219.0	08	317.1	256.7	68	363.7	294.5	28	410.3	332.3	88	457.0	370.0
49	271.2	219.6	09	317.9	257.3	69	364.5	295.1	29	411.1	332.9	89	457.8	370.6
50	272.0	220.2	10	318.6	258.0	70	365.3	295.7	30	411.9	333.5	90	458.5	371.3
351	272.8	220.8	411	319.4	258.6	471	366.0	296.4	531	412.6	334.1	591	459.3	371.9
52	273.6	221.5	12	320.2	259.2	72	366.8	297.0	32	413.4	334.8	92	460.1	372.5
53	274.3	222.1	13	321.0	259.9	73	367.6	297.6	33	414.2	335.4	93	460.9	373.2
54	275.1	222.7	14	321.8	260.5	74	368.4	298.3	34	415.0	336.1	94	461.6	373.8
55	275.9	223.4	15	322.5	261.1	75	369.2	298.9	35	415.8	336.7	95	462.4	374.4
56	276.7	224.0	16	323.3	261.8	76	369.9	299.5	36	416.5	337.3	96	463.2	375.1
57	277.5	224.6	17	324.1	262.4	77	370.7	300.1	37	417.3	337.9	97	464.0	375.7
58	278.2	225.3	18	324.9	263.0	78	371.5	300.8	38	418.1	338.5	98	464.8	376.3
59	279.0	225.9	19	325.6	263.6	79	372.3	301.4	39	418.9	339.1	99	465.5	376.9
60	279.8	226.5	20	326.4	264.3	80	373.0	302.0	40	419.6	339.8	600	466.3	377.6
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

51° (129°, 231°, 309°).

TABLE 2.

Difference of Latitude and Departure for 40° (140°, 220°, 320°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.8	0.6	61	46.7	39.2	121	92.7	77.8	181	138.7	116.3	241	184.6	154.9
2	1.5	1.3	62	47.5	39.9	22	93.5	78.4	82	139.4	117.0	42	185.4	155.6
3	2.3	1.9	63	48.3	40.5	23	94.2	79.1	83	140.2	117.6	43	186.1	156.2
4	3.1	2.6	64	49.0	41.1	24	95.0	79.7	84	141.0	118.3	44	186.9	156.8
5	3.8	3.2	65	49.8	41.8	25	95.8	80.3	85	141.7	118.9	45	187.7	157.5
6	4.6	3.9	66	50.6	42.4	26	96.5	81.0	86	142.5	119.6	46	188.4	158.1
7	5.4	4.5	67	51.3	43.1	27	97.3	81.6	87	143.3	120.2	47	189.2	158.8
8	6.1	5.1	68	52.1	43.7	28	98.1	82.3	88	144.0	120.8	48	190.0	159.4
9	6.9	5.8	69	52.9	44.4	29	98.8	82.9	89	144.8	121.5	49	190.7	160.1
10	7.7	6.4	70	53.6	45.0	30	99.6	83.6	90	145.5	122.1	50	191.5	160.7
11	8.4	7.1	71	54.4	45.6	131	100.4	84.2	191	146.3	122.8	251	192.3	161.3
12	9.2	7.7	72	55.2	46.3	32	101.1	84.8	92	147.1	123.4	52	193.0	162.0
13	10.0	8.4	73	55.9	46.9	33	101.9	85.5	93	147.8	124.1	53	193.8	162.6
14	10.7	9.0	74	56.7	47.6	34	102.6	86.1	94	148.6	124.7	54	194.6	163.3
15	11.5	9.6	75	57.5	48.2	35	103.4	86.8	95	149.4	125.3	55	195.3	163.9
16	12.3	10.3	76	58.2	48.9	36	104.2	87.4	96	150.1	126.0	56	196.1	164.6
17	13.0	10.9	77	59.0	49.5	37	104.9	88.1	97	150.9	126.6	57	196.9	165.2
18	13.8	11.6	78	59.8	50.1	38	105.7	88.7	98	151.7	127.3	58	197.6	165.8
19	14.6	12.2	79	60.5	50.8	39	106.5	89.3	99	152.4	127.9	59	198.4	166.5
20	15.3	12.9	80	61.3	51.4	40	107.2	90.0	200	153.2	128.6	60	199.2	167.1
21	16.1	13.5	81	62.0	52.1	141	108.0	90.6	201	154.0	129.2	261	199.9	167.8
22	16.9	14.1	82	62.8	52.7	42	108.8	91.3	02	154.7	129.8	62	200.7	168.4
23	17.6	14.8	83	63.6	53.4	43	109.5	91.9	03	155.5	130.5	63	201.5	169.1
24	18.4	15.4	84	64.3	54.0	44	110.3	92.6	04	156.3	131.1	64	202.2	169.7
25	19.2	16.1	85	65.1	54.6	45	111.1	93.2	05	157.0	131.8	65	203.0	170.3
26	19.9	16.7	86	65.9	55.3	46	111.8	93.8	06	157.8	132.4	66	203.8	171.0
27	20.7	17.4	87	66.6	55.9	47	112.6	94.5	07	158.6	133.1	67	204.5	171.6
28	21.4	18.0	88	67.4	56.6	48	113.4	95.1	08	159.3	133.7	68	205.3	172.3
29	22.2	18.6	89	68.2	57.2	49	114.1	95.8	09	160.1	134.3	69	206.1	172.9
30	23.0	19.3	90	68.9	57.9	50	114.9	96.4	10	160.9	135.0	70	206.8	173.6
31	23.7	19.9	91	69.7	58.5	151	115.7	97.1	211	161.6	135.6	271	207.6	174.2
32	24.5	20.6	92	70.5	59.1	52	116.4	97.7	12	162.4	136.3	72	208.4	174.8
33	25.3	21.2	93	71.2	59.8	53	117.2	98.3	13	163.2	136.9	73	209.1	175.5
34	26.0	21.9	94	72.0	60.4	54	118.0	99.0	14	163.9	137.6	74	209.9	176.1
35	26.8	22.5	95	72.8	61.1	55	118.7	99.6	15	164.7	138.2	75	210.7	176.8
36	27.6	23.1	96	73.5	61.7	56	119.5	100.3	16	165.5	138.8	76	211.4	177.4
37	28.3	23.8	97	74.3	62.4	57	120.3	100.9	17	166.2	139.5	77	212.2	178.1
38	29.1	24.4	98	75.1	63.0	58	121.0	101.6	18	167.0	140.1	78	213.0	178.7
39	29.9	25.1	99	75.8	63.6	59	121.8	102.2	19	167.8	140.8	79	213.7	179.3
40	30.6	25.7	100	76.6	64.3	60	122.6	102.8	20	168.5	141.4	80	214.5	180.0
41	31.4	26.4	101	77.4	64.9	161	123.3	103.5	221	169.3	142.1	281	215.3	180.6
42	32.2	27.0	02	78.1	65.6	62	124.1	104.1	22	170.1	142.7	82	216.0	181.3
43	32.9	27.6	03	78.9	66.2	63	124.9	104.8	23	170.8	143.3	83	216.8	181.9
44	33.7	28.3	04	79.7	66.8	64	125.6	105.4	24	171.6	144.0	84	217.6	182.6
45	34.5	28.9	05	80.4	67.5	65	126.4	106.1	25	172.4	144.6	85	218.3	183.2
46	35.2	29.6	06	81.2	68.1	66	127.2	106.7	26	173.1	145.3	86	219.1	183.8
47	36.0	30.2	07	82.0	68.8	67	127.9	107.3	27	173.9	145.9	87	219.9	184.5
48	36.8	30.9	08	82.7	69.4	68	128.7	108.0	28	174.7	146.6	88	220.6	185.1
49	37.5	31.5	09	83.5	70.1	69	129.5	108.6	29	175.4	147.2	89	221.4	185.8
50	38.3	32.1	10	84.3	70.7	70	130.2	109.3	30	176.2	147.8	90	222.2	186.4
51	39.1	32.8	111	85.0	71.3	171	131.0	109.9	231	177.0	148.5	291	222.9	187.1
52	39.8	33.4	12	85.8	72.0	72	131.8	110.6	32	177.7	149.1	92	223.7	187.7
53	40.6	34.1	13	86.6	72.6	73	132.5	111.2	33	178.5	149.8	93	224.5	188.3
54	41.4	34.7	14	87.3	73.3	74	133.3	111.8	34	179.3	150.4	94	225.2	189.0
55	42.1	35.4	15	88.1	73.9	75	134.1	112.5	35	180.0	151.1	95	226.0	189.6
56	42.9	36.0	16	88.9	74.6	76	134.8	113.1	36	180.8	151.7	96	226.7	190.3
57	43.7	36.6	17	89.6	75.2	77	135.6	113.8	37	181.6	152.3	97	227.5	190.9
58	44.4	37.3	18	90.4	75.8	78	136.4	114.4	38	182.3	153.0	98	228.3	191.6
59	45.2	37.9	19	91.2	76.5	79	137.1	115.1	39	183.1	153.6	99	229.0	192.2
60	46.0	38.6	20	91.9	77.1	80	137.9	115.7	40	183.9	154.3	300	229.8	192.8
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

50° (130°, 230°, 310°).

TABLE 2.

Difference of Latitude and Departure for 40° (140°, 220°, 320°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	230.6	193.5	361	276.5	232.1	421	322.5	270.6	481	368.5	309.2	541	414.4	347.7
02	231.3	194.1	62	277.3	232.7	22	323.3	271.3	82	369.2	309.8	42	415.2	348.4
03	232.1	194.8	63	278.1	233.3	23	324.0	271.9	83	370.0	310.5	43	416.0	349.0
04	232.9	195.4	64	278.8	234.0	24	324.8	272.6	84	370.8	311.1	44	416.7	349.7
05	233.6	196.1	65	279.6	234.6	25	325.6	273.2	85	371.5	311.7	45	417.5	350.3
06	234.4	196.7	66	280.4	235.3	26	326.3	273.8	86	372.3	312.4	46	418.3	351.0
07	235.2	197.3	67	281.1	235.9	27	327.1	274.5	87	373.1	313.0	47	419.0	351.6
08	235.9	198.0	68	281.9	236.6	28	327.9	275.1	88	373.8	313.6	48	419.8	352.2
09	236.7	198.6	69	282.7	237.2	29	328.6	275.8	89	374.6	314.3	49	420.6	352.9
10	237.5	199.3	70	283.4	237.8	30	329.4	276.4	90	375.4	314.9	50	421.3	353.5
311	238.2	199.9	371	284.2	238.5	431	330.2	277.1	491	376.1	315.6	551	422.1	354.2
12	239.0	200.6	72	285.0	239.1	32	330.9	277.7	92	376.9	316.2	52	422.9	354.8
13	239.8	201.2	73	285.7	239.7	33	331.7	278.3	93	377.7	316.9	53	423.6	355.5
14	240.5	201.8	74	286.5	240.4	34	332.5	279.0	94	378.4	317.5	54	424.4	356.1
15	241.3	202.5	75	287.3	241.0	35	333.2	279.6	95	379.2	318.2	55	425.2	356.8
16	242.1	203.1	76	288.0	241.7	36	334.0	280.3	96	380.0	318.8	56	425.9	357.4
17	242.8	203.8	77	288.8	242.3	37	334.8	280.9	97	380.7	319.5	57	426.7	358.0
18	243.6	204.4	78	289.6	243.0	38	335.5	281.6	98	381.5	320.1	58	427.5	358.7
19	244.4	205.1	79	290.3	243.6	39	336.3	282.2	99	382.3	320.8	59	428.2	359.3
20	245.1	205.7	80	291.1	244.3	40	337.1	282.8	500	383.0	321.4	60	429.0	360.0
321	245.9	206.3	381	291.9	244.9	441	337.8	283.5	501	383.8	322.0	561	429.8	360.6
22	246.7	207.0	82	292.6	245.6	42	338.6	284.1	02	384.6	322.7	62	430.5	361.2
23	247.4	207.6	83	293.4	246.2	43	339.4	284.8	03	385.3	323.3	63	431.3	361.9
24	248.2	208.3	84	294.2	246.8	44	340.1	285.4	04	386.1	324.0	64	432.1	362.5
25	249.0	208.9	85	294.9	247.5	45	340.9	286.0	05	386.8	324.6	65	432.8	363.2
26	249.7	209.6	86	295.7	248.1	46	341.7	286.7	06	387.6	325.2	66	433.6	363.8
27	250.5	210.2	87	296.5	248.8	47	342.4	287.3	07	388.4	325.9	67	434.3	364.5
28	251.3	210.8	88	297.2	249.4	48	343.2	288.0	08	389.2	326.5	68	435.1	365.1
29	252.0	211.5	89	298.0	250.1	49	344.0	288.6	09	389.9	327.1	69	435.9	365.8
30	252.8	212.1	90	298.8	250.7	50	344.7	289.3	10	390.7	327.8	70	436.6	366.4
331	253.6	212.8	391	299.5	251.3	451	345.5	289.9	511	391.5	328.4	571	437.4	367.0
32	254.3	213.4	92	300.3	252.0	52	346.3	290.5	12	392.2	329.1	72	438.2	367.7
33	255.1	214.1	93	301.1	252.6	53	347.0	291.2	13	393.0	329.7	73	438.9	368.3
34	255.9	214.7	94	301.8	253.3	54	347.8	291.8	14	393.8	330.4	74	439.7	369.0
35	256.6	215.3	95	302.6	253.9	55	348.6	292.5	15	394.5	331.0	75	440.5	369.6
36	257.4	216.0	96	303.4	254.6	56	349.3	293.1	16	395.3	331.6	76	441.2	370.2
37	258.2	216.6	97	304.1	255.2	57	350.1	293.8	17	396.1	332.3	77	442.0	370.9
38	258.9	217.3	98	304.9	255.8	58	350.8	294.4	18	396.8	332.9	78	442.8	371.5
39	259.7	217.9	99	305.7	256.5	59	351.6	295.0	19	397.6	333.6	79	443.5	372.2
40	260.5	218.6	400	306.4	257.1	60	352.4	295.7	20	398.3	334.2	80	444.3	372.8
341	261.2	219.2	401	307.2	257.8	461	353.1	296.3	521	399.1	334.9	581	445.1	373.5
42	262.0	219.8	02	308.0	258.4	62	353.9	297.0	22	399.9	335.5	82	445.8	374.1
43	262.8	220.5	03	308.7	259.1	63	354.7	297.6	23	400.6	336.1	83	446.6	374.8
44	263.5	221.1	04	309.5	259.7	64	355.4	298.3	24	401.4	336.8	84	447.4	375.4
45	264.3	221.8	05	310.2	260.3	65	356.2	298.9	25	402.2	337.4	85	448.1	376.0
46	265.1	222.4	06	311.0	261.0	66	357.0	299.5	26	402.9	338.1	86	448.9	376.7
47	265.8	223.1	07	311.8	261.6	67	357.7	300.2	27	403.7	338.7	87	449.7	377.3
48	266.6	223.7	08	312.5	262.3	68	358.5	300.8	28	404.5	339.4	88	450.4	378.0
49	267.4	224.3	09	313.3	262.9	69	359.3	301.5	29	405.2	340.0	89	451.2	378.6
50	268.1	225.0	10	314.1	263.6	70	360.0	302.1	30	406.0	340.6	90	452.0	379.2
351	268.9	225.6	411	314.8	264.2	471	360.8	302.8	531	406.8	341.3	591	452.7	379.9
52	269.6	226.3	12	315.6	264.8	72	361.6	303.4	32	407.5	341.9	92	453.5	380.5
53	270.4	226.9	13	316.4	265.5	73	362.3	304.0	33	408.3	342.6	93	454.3	381.2
54	271.2	227.6	14	317.1	266.1	74	363.1	304.7	34	409.1	343.2	94	455.0	381.8
55	271.9	228.2	15	317.9	266.8	75	363.9	305.3	35	409.8	343.9	95	455.8	382.4
56	272.7	228.8	16	318.7	267.4	76	364.6	306.0	36	410.6	344.5	96	456.6	383.1
57	273.5	229.5	17	319.4	268.1	77	365.4	306.6	37	411.4	345.2	97	457.3	383.7
58	274.2	230.1	18	320.2	268.7	78	366.2	307.3	38	412.1	345.8	98	458.1	384.4
59	275.0	230.8	19	321.0	269.3	79	366.9	307.9	39	412.9	346.4	99	458.9	385.0
60	275.8	231.4	20	321.7	270.0	80	367.7	308.5	40	413.7	347.1	600	459.6	385.7
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

50° (130°, 230°, 310°).

TABLE 2.

Difference of Latitude and Departure for 41° (139°, 221°, 319°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.8	0.7	61	46.0	40.0	121	91.3	79.4	181	136.6	118.7	241	181.9	158.1
2	1.5	1.3	62	46.8	40.7	22	92.1	80.0	82	137.4	119.4	42	182.6	158.8
3	2.3	2.0	63	47.5	41.3	23	92.8	80.7	83	138.1	120.1	43	183.4	159.4
4	3.0	2.6	64	48.3	42.0	24	93.6	81.4	84	138.9	120.7	44	184.1	160.1
5	3.8	3.3	65	49.1	42.6	25	94.3	82.0	85	139.6	121.4	45	184.9	160.7
6	4.5	3.9	66	49.8	43.3	26	95.1	82.7	86	140.4	122.0	46	185.7	161.4
7	5.3	4.6	67	50.6	44.0	27	95.8	83.3	87	141.1	122.7	47	186.4	162.0
8	6.0	5.2	68	51.3	44.6	28	96.6	84.0	88	141.9	123.3	48	187.2	162.7
9	6.8	5.9	69	52.1	45.3	29	97.4	84.6	89	142.6	124.0	49	187.9	163.4
10	7.5	6.6	70	52.8	45.9	30	98.1	85.3	90	143.4	124.7	50	188.7	164.0
11	8.3	7.2	71	53.6	46.6	131	98.9	85.9	191	144.1	125.3	251	189.4	164.7
12	9.1	7.9	72	54.3	47.2	32	99.6	86.6	92	144.9	126.0	52	190.2	165.3
13	9.8	8.5	73	55.1	47.9	33	100.4	87.3	93	145.7	126.6	53	190.9	166.0
14	10.6	9.2	74	55.8	48.5	34	101.1	87.9	94	146.4	127.3	54	191.7	166.6
15	11.3	9.8	75	56.6	49.2	35	101.9	88.6	95	147.2	127.9	55	192.5	167.3
16	12.1	10.5	76	57.4	49.9	36	102.6	89.2	96	147.9	128.6	56	193.2	168.0
17	12.8	11.2	77	58.1	50.5	37	103.4	89.9	97	148.7	129.2	57	194.0	168.6
18	13.6	11.8	78	58.9	51.2	38	104.1	90.5	98	149.4	129.9	58	194.7	169.3
19	14.3	12.5	79	59.6	51.8	39	104.9	91.2	99	150.2	130.6	59	195.5	169.9
20	15.1	13.1	80	60.4	52.5	40	105.7	91.8	200	150.9	131.2	60	196.2	170.6
21	15.8	13.8	81	61.1	53.1	141	106.4	92.5	201	151.7	131.9	261	197.0	171.2
22	16.6	14.4	82	61.9	53.8	42	107.2	93.2	02	152.5	132.5	62	197.7	171.9
23	17.4	15.1	83	62.6	54.5	43	107.9	93.8	03	153.2	133.2	63	198.5	172.5
24	18.1	15.7	84	63.4	55.1	44	108.7	94.5	04	154.0	133.8	64	199.2	173.2
25	18.9	16.4	85	64.2	55.8	45	109.4	95.1	05	154.7	134.5	65	200.0	173.9
26	19.6	17.1	86	64.9	56.4	46	110.2	95.8	06	155.5	135.1	66	200.8	174.5
27	20.4	17.7	87	65.7	57.1	47	110.9	96.4	07	156.2	135.8	67	201.5	175.2
28	21.1	18.4	88	66.4	57.7	48	111.7	97.1	08	157.0	136.5	68	202.3	175.8
29	21.9	19.0	89	67.2	58.4	49	112.5	97.8	09	157.7	137.1	69	203.0	176.5
30	22.6	19.7	90	67.9	59.0	50	113.2	98.4	10	158.5	137.8	70	203.8	177.1
31	23.4	20.3	91	68.7	59.7	151	114.0	99.1	211	159.2	138.4	271	204.5	177.8
32	24.2	21.0	92	69.4	60.4	52	114.7	99.7	12	160.0	139.1	72	205.3	178.4
33	24.9	21.6	93	70.2	61.0	53	115.5	100.4	13	160.8	139.7	73	206.0	179.1
34	25.7	22.3	94	70.9	61.7	54	116.2	101.0	14	161.5	140.4	74	206.8	179.8
35	26.4	23.0	95	71.7	62.3	55	117.0	101.7	15	162.3	141.1	75	207.5	180.4
36	27.2	23.6	96	72.5	63.0	56	117.7	102.3	16	163.0	141.7	76	208.3	181.1
37	27.9	24.3	97	73.2	63.6	57	118.5	103.0	17	163.8	142.4	77	209.1	181.7
38	28.7	24.9	98	74.0	64.3	58	119.2	103.7	18	164.5	143.0	78	209.8	182.4
39	29.4	25.6	99	74.7	64.9	59	120.0	104.3	19	165.3	143.7	79	210.6	183.0
40	30.2	26.2	100	75.5	65.6	60	120.8	105.0	20	166.0	144.3	80	211.3	183.7
41	30.9	26.9	101	76.2	66.3	161	121.5	105.6	221	166.8	145.0	281	212.1	184.4
42	31.7	27.6	02	77.0	66.9	62	122.3	106.3	22	167.5	145.6	82	212.8	185.0
43	32.5	28.2	03	77.7	67.6	63	123.0	106.9	23	168.3	146.3	83	213.6	185.7
44	33.2	28.9	04	78.5	68.2	64	123.8	107.6	24	169.1	147.0	84	214.3	186.3
45	34.0	29.5	05	79.2	68.9	65	124.5	108.2	25	169.8	147.6	85	215.1	187.0
46	34.7	30.2	06	80.0	69.5	66	125.3	108.9	26	170.6	148.3	86	215.8	187.6
47	35.5	30.8	07	80.8	70.2	67	126.0	109.6	27	171.3	148.9	87	216.6	188.3
48	36.2	31.5	08	81.5	70.9	68	126.8	110.2	28	172.1	149.6	88	217.4	188.9
49	37.0	32.1	09	82.3	71.5	69	127.5	110.9	29	172.8	150.2	89	218.1	189.6
50	37.7	32.8	10	83.0	72.2	70	128.3	111.5	30	173.6	150.9	90	218.9	190.3
51	38.5	33.5	111	83.8	72.8	171	129.1	112.2	231	174.3	151.5	291	219.6	190.9
52	39.2	34.1	12	84.5	73.5	72	129.8	112.8	32	175.1	152.2	92	220.4	191.6
53	40.0	34.8	13	85.3	74.1	73	130.6	113.5	33	175.8	152.9	93	221.1	192.2
54	40.8	35.4	14	86.0	74.8	74	131.3	114.2	34	176.6	153.5	94	221.9	192.9
55	41.5	36.1	15	86.8	75.4	75	132.1	114.8	35	177.4	154.2	95	222.6	193.5
56	42.3	36.7	16	87.5	76.1	76	132.8	115.5	36	178.1	154.8	96	223.4	194.2
57	43.0	37.4	17	88.3	76.8	77	133.6	116.1	37	178.9	155.5	97	224.1	194.8
58	43.8	38.1	18	89.1	77.4	78	134.3	116.8	38	179.6	156.1	98	224.9	195.5
59	44.5	38.7	19	89.8	78.1	79	135.1	117.4	39	180.4	156.8	99	225.7	196.2
60	45.3	39.4	20	90.6	78.7	80	135.8	118.1	40	181.1	157.5	300	226.4	196.8
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

49° (131°, 229°, 311°).

TABLE 2.

Difference of Latitude and Departure for 41° (139°, 221°, 319°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	227.2	197.5	361	272.5	236.9	421	317.7	276.2	481	363.0	315.6	541	408.3	354.9
02	227.9	198.1	62	273.2	237.5	22	318.5	276.9	82	363.8	316.2	42	409.0	355.6
03	228.7	198.8	63	274.0	238.2	23	319.2	277.5	83	364.5	316.9	43	409.8	356.2
04	229.4	199.4	64	274.7	238.8	24	320.0	278.2	84	365.3	317.5	44	410.6	356.9
05	230.2	200.1	65	275.5	239.5	25	320.8	278.8	85	366.0	318.2	45	411.3	357.5
06	230.9	200.8	66	276.2	240.1	26	321.5	279.5	86	366.8	318.8	46	412.1	358.2
07	231.7	201.4	67	277.0	240.8	27	322.3	280.1	87	367.5	319.5	47	412.8	358.8
08	232.5	202.1	68	277.7	241.4	28	323.0	280.8	88	368.3	320.1	48	413.6	359.5
09	233.2	202.7	69	278.5	242.1	29	323.8	281.5	89	369.0	320.8	49	414.3	360.2
10	234.0	203.4	70	279.2	242.7	30	324.5	282.1	90	369.8	321.5	50	415.1	360.8
311	234.7	204.0	371	280.0	243.4	431	325.3	282.8	491	370.6	322.1	551	415.8	361.5
12	235.5	204.7	72	280.8	244.1	32	326.0	283.4	92	371.3	322.8	52	416.6	362.1
13	236.2	205.4	73	281.5	244.7	33	326.8	284.1	93	372.1	323.4	53	417.3	362.8
14	237.0	206.0	74	282.3	245.4	34	327.5	284.7	94	372.8	324.1	54	418.1	363.4
15	237.7	206.7	75	283.0	246.0	35	328.3	285.4	95	373.6	324.7	55	418.9	364.1
16	238.5	207.3	76	283.8	246.7	36	329.1	286.0	96	374.3	325.4	56	419.6	364.8
17	239.2	208.0	77	284.5	247.3	37	329.8	286.7	97	375.1	326.0	57	420.4	365.4
18	240.0	208.6	78	285.3	248.0	38	330.6	287.4	98	375.8	326.7	58	421.1	366.1
19	240.8	209.3	79	286.0	248.7	39	331.3	288.0	99	376.6	327.4	59	421.9	366.7
20	241.5	209.9	80	286.8	249.3	40	332.1	288.7	500	377.3	328.0	60	422.6	367.4
321	242.3	210.6	381	287.5	250.0	441	332.8	289.3	501	378.1	328.7	561	423.4	368.0
22	243.0	211.3	82	288.3	250.6	42	333.6	290.0	02	378.9	329.3	62	424.1	368.7
23	243.8	211.9	83	289.1	251.3	43	334.3	290.6	03	379.6	330.0	63	424.9	369.4
24	244.5	212.6	84	289.8	251.9	44	335.1	291.3	04	380.4	330.6	64	425.7	370.0
25	245.3	213.2	85	290.6	252.6	45	335.8	292.0	05	381.1	331.3	65	426.4	370.7
26	246.0	213.9	86	291.3	253.2	46	336.6	292.6	06	381.9	332.0	66	427.2	371.3
27	246.8	214.5	87	292.1	253.9	47	337.4	293.3	07	382.6	332.6	67	427.9	372.0
28	247.5	215.2	88	292.8	254.6	48	338.1	293.9	08	383.4	333.3	68	428.7	372.6
29	248.3	215.9	89	293.6	255.2	49	338.9	294.6	09	384.1	333.9	69	429.4	373.3
30	249.1	216.5	90	294.3	255.9	50	339.6	295.2	10	384.9	334.6	70	430.2	374.0
331	249.8	217.2	391	295.1	256.5	451	340.4	295.9	511	385.7	335.2	571	430.9	374.6
32	250.6	217.8	92	295.8	257.2	52	341.1	296.5	12	386.4	335.9	72	431.7	375.3
33	251.3	218.5	93	296.6	257.8	53	341.9	297.2	13	387.2	336.5	73	432.4	375.9
34	252.1	219.1	94	297.4	258.5	54	342.6	297.9	14	387.9	337.2	74	433.2	376.6
35	252.8	219.8	95	298.1	259.2	55	343.4	298.5	15	388.7	337.9	75	434.0	377.2
36	253.6	220.4	96	298.9	259.8	56	344.1	299.2	16	389.4	338.5	76	434.7	377.9
37	254.3	221.1	97	299.6	260.5	57	344.9	299.8	17	390.2	339.2	77	435.5	378.5
38	255.1	221.8	98	300.4	261.1	58	345.7	300.5	18	390.9	339.8	78	436.2	379.2
39	255.8	222.4	99	301.1	261.8	59	346.4	301.1	19	391.7	340.5	79	437.0	379.8
40	256.6	223.1	400	301.9	262.4	60	347.2	301.8	20	392.4	341.1	80	437.7	380.5
341	257.4	223.7	401	302.6	263.1	461	347.9	302.5	521	393.2	341.8	581	438.5	381.2
42	258.1	224.4	02	303.4	263.7	62	348.7	303.1	22	394.0	342.5	82	439.2	381.8
43	258.9	225.0	03	304.2	264.4	63	349.4	303.8	23	394.7	343.1	83	440.0	382.5
44	259.6	225.7	04	304.9	265.1	64	350.2	304.4	24	395.5	343.8	84	440.7	383.2
45	260.4	226.3	05	305.7	265.7	65	350.9	305.1	25	396.2	344.4	85	441.5	383.8
46	261.1	227.0	06	306.4	266.4	66	351.7	305.7	26	397.0	345.1	86	442.3	384.5
47	261.9	227.7	07	307.2	267.0	67	352.5	306.4	27	397.7	345.7	87	443.0	385.1
48	262.6	228.3	08	307.9	267.7	68	353.2	307.0	28	398.5	346.4	88	443.8	385.8
49	263.4	229.0	09	308.7	268.3	69	354.0	307.7	29	399.2	347.0	89	444.5	386.4
50	264.2	229.6	10	309.4	269.0	70	354.7	308.4	30	400.0	347.7	90	445.3	387.1
351	264.9	230.3	411	310.2	269.6	471	355.5	309.0	531	400.7	348.4	591	446.0	387.7
52	265.7	230.9	12	310.9	270.3	72	356.2	309.7	32	401.5	349.0	92	446.8	388.4
53	266.4	231.6	13	311.7	271.0	73	357.0	310.3	33	402.2	349.7	93	447.5	389.1
54	267.2	232.3	14	312.5	271.6	74	357.7	311.0	34	403.0	350.3	94	448.3	389.7
55	267.9	232.9	15	313.2	272.3	75	358.5	311.6	35	403.8	351.0	95	449.1	390.4
56	268.7	233.6	16	314.0	272.9	76	359.2	312.3	36	404.5	351.6	96	449.8	391.0
57	269.4	234.2	17	314.7	273.6	77	360.0	312.9	37	405.3	352.3	97	450.6	391.7
58	270.2	234.9	18	315.5	274.2	78	360.8	313.6	38	406.0	352.9	98	451.3	392.3
59	270.9	235.5	19	316.2	274.9	79	361.5	314.3	39	406.8	353.6	99	452.1	393.0
60	271.7	236.2	20	317.0	275.6	80	362.3	314.9	40	407.5	354.3	600	452.8	393.6
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

49° (131°, 229°, 311°).

TABLE 2.

Difference of Latitude and Departure for 42° (138°, 222°, 318°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.7	0.7	61	45.3	40.8	121	89.9	81.0	181	134.5	121.1	241	179.1	161.3
2	1.5	1.3	62	46.1	41.5	22	90.7	81.6	82	135.3	121.8	42	179.8	161.9
3	2.2	2.0	63	46.8	42.2	23	91.4	82.3	83	136.0	122.5	43	180.6	162.6
4	3.0	2.7	64	47.6	42.8	24	92.1	83.0	84	136.7	123.1	44	181.3	163.3
5	3.7	3.3	65	48.3	43.5	25	92.9	83.6	85	137.5	123.8	45	182.1	163.9
6	4.5	4.0	66	49.0	44.2	26	93.6	84.3	86	138.2	124.5	46	182.8	164.6
7	5.2	4.7	67	49.8	44.8	27	94.4	85.0	87	139.0	125.1	47	183.6	165.3
8	5.9	5.4	68	50.5	45.5	28	95.1	85.6	88	139.7	125.8	48	184.3	165.9
9	6.7	6.0	69	51.3	46.2	29	95.9	86.3	89	140.5	126.5	49	185.0	166.6
10	7.4	6.7	70	52.0	46.8	30	96.6	87.0	90	141.2	127.1	50	185.8	167.3
11	8.2	7.4	71	52.8	47.5	131	97.4	87.7	191	141.9	127.8	251	186.5	168.0
12	8.9	8.0	72	53.5	48.2	32	98.1	88.3	92	142.7	128.5	52	187.3	168.6
13	9.7	8.7	73	54.2	48.8	33	98.8	89.0	93	143.4	129.1	53	188.0	169.3
14	10.4	9.4	74	55.0	49.5	34	99.6	89.7	94	144.2	129.8	54	188.8	170.0
15	11.1	10.0	75	55.7	50.2	35	100.3	90.3	95	144.9	130.5	55	189.5	170.6
16	11.9	10.7	76	56.5	50.9	36	101.1	91.0	96	145.7	131.1	56	190.2	171.3
17	12.6	11.4	77	57.2	51.5	37	101.8	91.7	97	146.4	131.8	57	191.0	172.0
18	13.4	12.0	78	58.0	52.2	38	102.6	92.3	98	147.1	132.5	58	191.7	172.6
19	14.1	12.7	79	58.7	52.9	39	103.3	93.0	99	147.9	133.2	59	192.5	173.3
20	14.9	13.4	80	59.5	53.5	40	104.0	93.7	200	148.6	133.8	60	193.2	174.0
21	15.6	14.1	81	60.2	54.2	141	104.8	94.3	201	149.4	134.5	261	194.0	174.6
22	16.3	14.7	82	60.9	54.9	42	105.5	95.0	02	150.1	135.2	62	194.7	175.3
23	17.1	15.4	83	61.7	55.5	43	106.3	95.7	03	150.9	135.8	63	195.4	176.0
24	17.8	16.1	84	62.4	56.2	44	107.0	96.4	04	151.6	136.5	64	196.2	176.7
25	18.6	16.7	85	63.2	56.9	45	107.8	97.0	05	152.3	137.2	65	196.9	177.3
26	19.3	17.4	86	63.9	57.5	46	108.5	97.7	06	153.1	137.8	66	197.7	178.0
27	20.1	18.1	87	64.7	58.2	47	109.2	98.4	07	153.8	138.5	67	198.4	178.7
28	20.8	18.7	88	65.4	58.9	48	110.0	99.0	08	154.6	139.2	68	199.2	179.3
29	21.6	19.4	89	66.1	59.6	49	110.7	99.7	09	155.3	139.8	69	199.9	180.0
30	22.3	20.1	90	66.9	60.2	50	111.5	100.4	10	156.1	140.5	70	200.6	180.7
31	23.0	20.7	91	67.6	60.9	151	112.2	101.0	211	156.8	141.2	271	201.4	181.3
32	23.8	21.4	92	68.4	61.6	52	113.0	101.7	12	157.5	141.9	72	202.1	182.0
33	24.5	22.1	93	69.1	62.2	53	113.7	102.4	13	158.3	142.5	73	202.9	182.7
34	25.3	22.8	94	69.9	62.9	54	114.4	103.0	14	159.0	143.2	74	203.6	183.3
35	26.0	23.4	95	70.6	63.6	55	115.2	103.7	15	159.8	143.9	75	204.4	184.0
36	26.8	24.1	96	71.3	64.2	56	115.9	104.4	16	160.5	144.5	76	205.1	184.7
37	27.5	24.8	97	72.1	64.9	57	116.7	105.1	17	161.3	145.2	77	205.9	185.3
38	28.2	25.4	98	72.8	65.6	58	117.4	105.7	18	162.0	145.9	78	206.6	186.0
39	29.0	26.1	99	73.6	66.2	59	118.2	106.4	19	162.7	146.5	79	207.3	186.7
40	29.7	26.8	100	74.3	66.9	60	118.9	107.1	20	163.5	147.2	80	208.1	187.4
41	30.5	27.4	101	75.1	67.6	161	119.6	107.7	221	164.2	147.9	281	208.8	188.0
42	31.2	28.1	02	75.8	68.3	62	120.4	108.4	22	165.0	148.5	82	209.6	188.7
43	32.0	28.8	03	76.5	68.9	63	121.1	109.1	23	165.7	149.2	83	210.3	189.4
44	32.7	29.4	04	77.3	69.6	64	121.9	109.7	24	166.5	149.9	84	211.1	190.0
45	33.4	30.1	05	78.0	70.3	65	122.6	110.4	25	167.2	150.6	85	211.8	190.7
46	34.2	30.8	06	78.8	70.9	66	123.4	111.1	26	168.0	151.2	86	212.5	191.4
47	34.9	31.4	07	79.5	71.6	67	124.1	111.7	27	168.7	151.9	87	213.3	192.0
48	35.7	32.1	08	80.3	72.3	68	124.8	112.4	28	169.4	152.6	88	214.0	192.7
49	36.4	32.8	09	81.0	72.9	69	125.6	113.1	29	170.2	153.2	89	214.8	193.4
50	37.2	33.5	10	81.7	73.6	70	126.3	113.8	30	170.9	153.9	90	215.5	194.0
51	37.9	34.1	111	82.5	74.3	171	127.1	114.4	231	171.7	154.6	291	216.3	194.7
52	38.6	34.8	12	83.2	74.9	72	127.8	115.1	32	172.4	155.2	92	217.0	195.4
53	39.4	35.5	13	84.0	75.6	73	128.6	115.8	33	173.2	155.9	93	217.7	196.1
54	40.1	36.1	14	84.7	76.3	74	129.3	116.4	34	173.9	156.6	94	218.5	196.7
55	40.9	36.8	15	85.5	77.0	75	130.1	117.1	35	174.6	157.2	95	219.2	197.4
56	41.6	37.5	16	86.2	77.6	76	130.8	117.8	36	175.4	157.9	96	220.0	198.1
57	42.4	38.1	17	86.9	78.3	77	131.5	118.4	37	176.1	158.6	97	220.7	198.7
58	43.1	38.8	18	87.7	79.0	78	132.3	119.1	38	176.9	159.3	98	221.5	199.4
59	43.8	39.5	19	88.4	79.6	79	133.0	119.8	39	177.6	159.9	99	222.2	200.1
60	44.6	40.1	20	89.2	80.3	80	133.8	120.4	40	178.4	160.6	300	222.9	200.7
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

48° (132°, 228°, 312).

TABLE 2.

Difference of Latitude and Departure for 42° (138°, 222°, 318°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	223.7	201.4	361	268.3	241.6	421	312.9	281.7	481	357.5	321.9	541	402.1	362.0
02	224.4	202.1	62	269.0	242.2	22	313.6	282.4	82	358.2	322.5	42	402.8	362.7
03	225.2	202.8	63	269.8	242.9	23	314.4	283.0	83	358.9	323.2	43	403.5	363.3
04	225.9	203.4	64	270.5	243.6	24	315.1	283.7	84	359.7	323.9	44	404.3	364.0
05	226.6	204.1	65	271.2	244.2	25	315.8	284.4	85	360.4	324.6	45	405.0	364.7
06	227.4	204.8	66	272.0	244.9	26	316.6	285.1	86	361.2	325.2	46	405.8	365.4
07	228.1	205.4	67	272.7	245.6	27	317.3	285.7	87	361.9	325.9	47	406.5	366.0
08	228.9	206.1	68	273.5	246.2	48	318.1	286.4	88	362.7	326.6	48	407.2	366.7
09	229.6	206.8	69	274.2	246.9	29	318.8	287.1	89	363.4	327.2	49	408.0	367.4
10	230.4	207.4	70	275.0	247.6	30	319.6	287.7	90	364.1	327.9	50	408.7	368.0
311	231.1	208.1	371	275.7	248.3	431	320.3	288.4	491	364.9	328.6	551	409.5	368.7
12	231.9	208.8	72	276.5	248.9	32	321.0	289.1	92	365.6	329.2	52	410.2	369.4
13	232.6	209.4	73	277.2	249.6	33	321.8	289.7	93	366.4	329.9	53	411.0	370.0
14	233.3	210.1	74	277.9	250.3	34	322.5	290.4	94	367.1	330.6	54	411.7	370.7
15	234.1	210.8	75	278.7	250.9	35	323.3	291.1	95	367.9	331.3	55	412.4	371.4
16	234.8	211.5	76	279.4	251.6	36	324.0	291.7	96	368.6	331.9	56	413.2	372.0
17	235.6	212.1	77	280.2	252.3	37	324.8	292.4	97	369.3	332.6	57	413.9	372.7
18	236.3	212.8	78	280.9	252.9	38	325.5	293.1	98	370.1	333.3	58	414.7	373.4
19	237.1	213.5	79	281.7	253.6	39	326.2	293.8	99	370.8	333.9	59	415.4	374.1
20	237.8	214.1	80	282.4	254.3	40	327.0	294.4	500	371.6	334.6	60	416.2	374.7
321	238.6	214.8	381	283.1	254.9	441	327.7	295.1	501	372.3	335.3	561	416.9	375.4
22	239.3	215.5	82	283.9	255.6	42	328.5	295.8	02	373.1	335.9	62	417.6	376.1
23	240.0	216.1	83	284.6	256.3	43	329.2	296.4	03	373.8	336.6	63	418.4	376.7
24	240.8	216.8	84	285.4	257.0	44	330.0	297.1	04	374.5	337.2	64	419.1	377.4
25	241.5	217.5	85	286.1	257.6	45	330.7	297.8	05	375.3	337.9	65	419.9	378.1
26	242.3	218.1	86	286.9	258.3	46	331.4	298.4	06	376.0	338.6	66	420.6	378.7
27	243.0	218.8	87	287.6	259.0	47	332.2	299.1	07	376.8	339.3	67	421.4	379.4
28	243.8	219.5	88	288.3	259.6	48	332.9	299.8	08	377.5	339.9	68	422.1	380.1
29	244.5	220.1	89	289.1	260.3	49	333.7	300.4	09	378.3	340.6	69	422.8	380.7
30	245.2	220.8	90	289.8	261.0	50	334.4	301.1	10	379.0	341.3	70	423.6	381.4
331	246.0	221.5	391	290.6	261.6	451	335.2	301.8	511	379.7	341.9	571	424.3	382.1
32	246.7	222.2	92	291.3	262.3	52	335.9	302.5	12	380.5	342.6	72	425.1	382.8
33	247.5	222.8	93	292.1	263.0	53	336.6	303.1	13	381.2	343.3	73	425.8	383.4
34	248.2	223.5	94	292.8	263.6	54	337.4	303.8	14	382.0	343.9	74	426.6	384.1
35	249.0	224.2	95	293.5	264.3	55	338.1	304.5	15	382.7	344.6	75	427.3	384.8
36	249.7	224.8	96	294.3	265.0	56	338.9	305.1	16	383.5	345.3	76	428.0	385.4
37	250.4	225.5	97	295.0	265.7	57	339.6	305.8	17	384.2	346.0	77	428.8	386.1
38	251.2	226.2	98	295.8	266.3	58	340.4	306.5	18	384.9	346.6	78	429.5	386.8
39	251.9	226.8	99	296.5	267.0	59	341.1	307.1	19	385.7	347.3	79	430.3	387.4
40	252.7	227.5	400	297.3	267.7	60	341.8	307.8	20	386.4	348.0	80	431.0	388.1
341	253.4	228.2	401	298.0	268.3	461	342.6	308.5	521	387.2	348.6	581	431.8	388.8
42	254.2	228.8	02	298.7	269.0	62	343.3	309.1	22	387.9	349.3	82	432.5	389.4
43	254.9	229.5	03	299.5	269.7	63	344.1	309.8	23	388.7	350.0	83	433.2	390.1
44	255.6	230.2	04	300.2	270.3	64	344.8	310.5	24	389.4	350.6	84	434.0	390.8
45	256.4	230.9	05	301.0	271.0	65	345.6	311.2	25	390.1	351.3	85	434.7	391.4
46	257.1	231.5	06	301.7	271.7	66	346.3	311.8	26	390.9	352.0	86	435.5	392.1
47	257.9	232.2	07	302.5	272.3	67	347.0	312.5	27	391.6	352.6	87	436.2	392.8
48	258.6	232.9	08	303.2	273.0	68	347.8	313.2	28	392.4	353.3	88	437.0	393.4
49	259.4	233.5	09	303.9	273.7	69	348.5	313.8	29	393.1	354.0	89	437.7	394.1
50	260.1	234.2	10	304.7	274.3	70	349.3	314.5	30	393.9	354.6	90	438.4	394.8
351	260.8	234.9	411	305.4	275.0	471	350.0	315.2	531	394.6	355.3	591	439.2	395.4
52	261.6	235.5	12	306.2	275.7	72	350.8	315.8	32	395.3	356.0	92	440.0	396.1
53	262.3	236.2	13	306.9	276.4	73	351.5	316.5	33	396.1	356.6	93	440.7	396.8
54	263.1	236.9	14	307.7	277.0	74	352.3	317.2	34	396.8	357.3	94	441.4	397.5
55	263.8	237.5	15	308.4	277.7	75	353.0	317.8	35	397.6	358.0	95	442.2	398.1
56	264.6	238.2	16	309.1	278.4	76	353.7	318.5	36	398.3	358.6	96	442.9	398.8
57	265.3	238.9	17	309.9	279.0	77	354.5	319.2	37	399.1	359.3	97	443.7	399.5
58	266.0	239.6	18	310.6	279.7	78	355.2	319.9	38	399.8	360.0	98	444.4	400.1
59	266.8	240.2	19	311.4	280.4	79	356.0	320.5	39	400.6	360.6	99	445.2	400.8
60	267.5	240.9	20	312.1	281.0	80	356.7	321.2	40	401.3	361.3	600	445.9	401.5
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

48° (132°, 228°, 312°).

TABLE 2.

Difference of Latitude and Departure for 43° (137°, 223°, 317°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.7	0.7	61	44.6	41.6	121	88.5	82.5	181	132.4	123.4	241	176.3	164.4
2	1.5	1.4	62	45.3	42.3	22	89.2	83.2	82	133.1	124.1	42	177.0	165.0
3	2.2	2.0	63	46.1	43.0	23	90.0	83.9	83	133.8	124.8	43	177.7	165.7
4	2.9	2.7	64	46.8	43.6	24	90.7	84.6	84	134.6	125.5	44	178.5	166.4
5	3.7	3.4	65	47.5	44.3	25	91.4	85.2	85	135.3	126.2	45	179.2	167.1
6	4.4	4.1	66	48.3	45.0	26	92.2	85.9	86	136.0	126.9	46	179.9	167.8
7	5.1	4.8	67	49.0	45.7	27	92.9	86.6	87	136.8	127.5	47	180.6	168.5
8	5.9	5.5	68	49.7	46.4	28	93.6	87.3	88	137.5	128.2	48	181.4	169.1
9	6.6	6.1	69	50.5	47.1	29	94.3	88.0	89	138.2	128.9	49	182.1	169.8
10	7.3	6.8	70	51.2	47.7	30	95.1	88.7	90	139.0	129.6	50	182.8	170.5
11	8.0	7.5	71	51.9	48.4	131	95.8	89.3	191	139.7	130.3	251	183.6	171.2
12	8.8	8.2	72	52.7	49.1	32	96.5	90.0	92	140.4	130.9	52	184.3	171.9
13	9.5	8.9	73	53.4	49.8	33	97.3	90.7	93	141.2	131.6	53	185.0	172.5
14	10.2	9.5	74	54.1	50.5	34	98.0	91.4	94	141.9	132.3	54	185.8	173.2
15	11.0	10.2	75	54.9	51.1	35	98.7	92.1	95	142.6	133.0	55	186.5	173.9
16	11.7	10.9	76	55.6	51.8	36	99.5	92.8	96	143.3	133.7	56	187.2	174.6
17	12.4	11.6	77	56.3	52.5	37	100.2	93.4	97	144.1	134.4	57	188.0	175.3
18	13.2	12.3	78	57.0	53.2	38	100.9	94.1	98	144.8	135.0	58	188.7	176.0
19	13.9	13.0	79	57.8	53.9	39	101.7	94.8	99	145.5	135.7	59	189.4	176.6
20	14.6	13.6	80	58.5	54.6	40	102.4	95.5	200	146.3	136.4	60	190.2	177.3
21	15.4	14.3	81	59.2	55.2	141	103.1	96.2	201	147.0	137.1	261	190.9	178.0
22	16.1	15.0	82	60.0	55.9	42	103.9	96.8	02	147.7	137.8	62	191.6	178.7
23	16.8	15.7	83	60.7	56.6	43	104.6	97.5	03	148.5	138.4	63	192.3	179.4
24	17.6	16.4	84	61.4	57.3	44	105.3	98.2	04	149.2	139.1	64	193.1	180.0
25	18.3	17.0	85	62.2	58.0	45	106.0	98.9	05	149.9	139.8	65	193.8	180.7
26	19.0	17.7	86	62.9	58.7	46	106.8	99.6	06	150.7	140.5	66	194.5	181.4
27	19.7	18.4	87	63.6	59.3	47	107.5	100.3	07	151.4	141.2	67	195.3	182.1
28	20.5	19.1	88	64.4	60.0	48	108.2	100.9	08	152.1	141.9	68	196.0	182.8
29	21.2	19.8	89	65.1	60.7	49	109.0	101.6	09	152.9	142.5	69	196.7	183.5
30	21.9	20.5	90	65.8	61.4	50	109.7	102.3	10	153.6	143.2	70	197.5	184.1
31	22.7	21.1	91	66.6	62.1	151	110.4	103.0	211	154.3	143.9	271	198.2	184.8
32	23.4	21.8	92	67.3	62.7	52	111.2	103.7	12	155.0	144.6	72	198.9	185.5
33	24.1	22.5	93	68.0	63.4	53	111.9	104.3	13	155.8	145.3	73	199.7	186.2
34	24.9	23.2	94	68.7	64.1	54	112.6	105.0	14	156.5	145.9	74	200.4	186.9
35	25.6	23.9	95	69.5	64.8	55	113.4	105.7	15	157.2	146.6	75	201.1	187.5
36	26.3	24.6	96	70.2	65.5	56	114.1	106.4	16	158.0	147.3	76	201.9	188.2
37	27.1	25.2	97	70.9	66.2	57	114.8	107.1	17	158.7	148.0	77	202.6	188.9
38	27.8	25.9	98	71.7	66.8	58	115.6	107.8	18	159.4	148.7	78	203.3	189.6
39	28.5	26.6	99	72.4	67.5	59	116.3	108.4	19	160.2	149.4	79	204.0	190.3
40	29.3	27.3	100	73.1	68.2	60	117.0	109.1	20	160.9	150.0	80	204.8	191.0
41	30.0	28.0	101	73.9	68.9	161	117.7	109.8	221	161.6	150.7	281	205.5	191.6
42	30.7	28.6	02	74.6	69.6	62	118.5	110.5	22	162.4	151.4	82	206.2	192.3
43	31.4	29.3	03	75.3	70.2	63	119.2	111.2	23	163.1	152.1	83	207.0	193.0
44	32.2	30.0	04	76.1	70.9	64	119.9	111.8	24	163.8	152.8	84	207.7	193.7
45	32.9	30.7	05	76.8	71.6	65	120.7	112.5	25	164.6	153.4	85	208.4	194.4
46	33.6	31.4	06	77.5	72.3	66	121.4	113.2	26	165.3	154.1	86	209.2	195.1
47	34.4	32.1	07	78.3	73.0	67	122.1	113.9	27	166.0	154.8	87	209.9	195.7
48	35.1	32.7	08	79.0	73.7	68	122.9	114.6	28	166.7	155.5	88	210.6	196.4
49	35.8	33.4	09	79.7	74.3	69	123.6	115.3	29	167.5	156.2	89	211.4	197.1
50	36.6	34.1	10	80.4	75.0	70	124.3	115.9	30	168.2	156.9	90	212.1	197.8
51	37.3	34.8	111	81.2	75.7	171	125.1	116.6	231	168.9	157.5	291	212.8	198.5
52	38.0	35.5	12	81.9	76.4	72	125.8	117.3	32	169.7	158.2	92	213.6	199.1
53	38.8	36.1	13	82.6	77.1	73	126.5	118.0	33	170.4	158.9	93	214.3	199.8
54	39.5	36.8	14	83.4	77.7	74	127.3	118.7	34	171.1	159.6	94	215.0	200.5
55	40.2	37.5	15	84.1	78.4	75	128.0	119.3	35	171.9	160.3	95	215.7	201.2
56	41.0	38.2	16	84.8	79.1	76	128.7	120.0	36	172.6	161.0	96	216.5	201.9
57	41.7	38.9	17	85.6	79.8	77	129.4	120.7	37	173.3	161.6	97	217.2	202.6
58	42.4	39.6	18	86.3	80.5	78	130.2	121.4	38	174.1	162.3	98	217.9	203.2
59	43.1	40.2	19	87.0	81.2	79	130.9	122.1	39	174.8	163.0	99	218.7	203.9
60	43.9	40.9	20	87.8	81.8	80	131.6	122.8	40	175.5	163.7	300	219.4	204.6
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

47° (133°, 227°, 313°).

TABLE 2.

Difference of Latitude and Departure for 43° (137°, 223°, 317°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	220.1	205.3	361	264.0	246.2	421	307.9	287.1	481	351.8	328.1	541	395.7	369.0
02	220.9	206.0	62	264.8	246.9	22	308.6	287.8	82	352.5	328.7	42	396.4	369.7
03	221.6	206.7	63	265.5	247.6	23	309.4	288.5	83	353.2	329.4	43	397.1	370.3
04	222.3	207.3	64	266.2	248.3	24	310.1	289.2	84	354.0	330.1	44	397.9	371.0
05	223.1	208.0	65	267.0	248.9	25	310.8	289.9	85	354.7	330.8	45	398.6	371.7
06	223.8	208.7	66	267.7	249.6	26	311.6	290.5	86	355.4	331.4	46	399.3	372.4
07	224.5	209.4	67	268.4	250.3	27	312.3	291.2	87	356.2	332.1	47	400.1	373.1
08	225.3	210.1	68	269.1	251.0	28	313.0	291.9	88	356.9	332.8	48	400.8	373.7
09	226.0	210.7	69	269.9	251.7	29	313.8	292.6	89	357.7	333.5	49	401.5	374.4
10	226.7	211.4	70	270.6	252.3	30	314.5	293.3	90	358.4	334.2	50	402.2	375.1
311	227.5	212.1	371	271.3	253.0	431	315.2	293.9	491	359.1	334.9	551	403.0	375.8
12	228.2	212.8	72	272.1	253.7	32	316.0	294.6	92	359.8	335.5	52	403.7	376.5
13	228.9	213.5	73	272.8	254.4	33	316.7	295.3	93	360.6	336.2	53	404.4	377.1
14	229.7	214.2	74	273.5	255.1	34	317.4	296.0	94	361.3	336.9	54	405.2	377.8
15	230.4	214.8	75	274.3	255.8	35	318.1	296.7	95	362.0	337.6	55	405.9	378.5
16	231.1	215.5	76	275.0	256.4	36	318.9	297.4	96	362.8	338.3	56	406.6	379.2
17	231.8	216.2	77	275.7	257.1	37	319.6	298.0	97	363.5	338.9	57	407.4	379.9
18	232.6	216.9	78	276.5	257.8	38	320.3	298.7	98	364.2	339.6	58	408.1	380.6
19	233.3	217.6	79	277.2	258.5	39	321.1	299.4	99	364.9	340.3	59	408.8	381.2
20	234.0	218.2	80	277.9	259.2	40	321.8	300.1	500	365.7	341.0	60	409.6	381.9
321	234.8	218.9	381	278.7	259.8	441	322.5	300.8	501	366.4	341.7	561	410.3	382.6
22	235.5	219.6	82	279.4	260.5	42	323.3	301.4	02	367.1	342.4	62	411.0	383.3
23	236.2	220.3	83	280.1	261.2	43	324.0	302.1	03	367.8	343.0	63	411.8	384.0
24	237.0	221.0	84	280.8	261.9	44	324.7	302.8	04	368.6	343.7	64	412.5	384.6
25	237.7	221.7	85	281.6	262.6	45	325.5	303.5	05	369.3	344.4	65	413.2	385.3
26	238.4	222.3	86	282.3	263.3	46	326.2	304.2	06	370.0	345.1	66	414.0	386.0
27	239.2	223.0	87	283.0	263.9	47	326.9	304.9	07	370.8	345.8	67	414.7	386.7
28	239.9	223.7	88	283.7	264.6	48	327.7	305.5	08	371.5	346.5	68	415.4	387.4
29	240.6	224.4	89	284.5	265.3	49	328.4	306.2	09	372.3	347.1	69	416.2	388.1
30	241.4	225.1	90	285.2	266.0	50	329.1	306.9	10	373.0	347.8	70	416.9	388.7
331	242.1	225.7	391	286.0	266.7	451	329.9	307.6	511	373.8	348.5	571	417.6	389.4
32	242.8	226.4	92	286.7	267.3	52	330.6	308.3	12	374.5	349.2	72	418.3	390.1
33	243.5	227.1	93	287.4	268.0	53	331.3	309.0	13	375.2	349.9	73	419.1	390.8
34	244.3	227.8	94	288.2	268.7	54	332.1	309.6	14	376.0	350.5	74	419.8	391.5
35	245.0	228.5	95	288.9	269.4	55	332.8	310.3	15	376.6	351.2	75	420.5	392.2
36	245.7	229.2	96	289.6	270.1	56	333.5	311.0	16	377.4	351.9	76	421.3	392.8
37	246.5	229.8	97	290.4	270.8	57	334.3	311.7	17	378.2	352.6	77	422.0	393.5
38	247.2	230.5	98	291.1	271.4	58	335.0	312.4	18	378.9	353.3	78	422.7	394.2
39	247.9	231.2	99	291.8	272.1	59	335.7	313.0	19	379.6	354.0	79	423.5	394.9
40	248.7	231.9	400	292.6	272.8	60	336.5	313.7	20	380.3	354.6	80	424.2	395.6
341	249.4	232.6	401	293.3	273.5	461	337.2	314.4	521	381.1	355.3	581	424.9	396.2
42	250.1	233.2	02	294.0	274.2	62	337.9	315.1	22	381.8	356.0	82	425.7	396.9
43	250.9	233.9	03	294.7	274.9	63	338.7	315.8	23	382.6	356.7	83	426.4	397.6
44	251.6	234.6	04	295.5	275.5	64	339.4	316.5	24	383.3	357.4	84	427.1	398.3
45	252.3	235.3	05	296.2	276.2	65	340.1	317.1	25	384.0	358.1	85	427.9	399.0
46	253.1	236.0	06	296.9	276.9	66	340.8	317.8	26	384.7	358.7	86	428.6	399.6
47	253.8	236.7	07	297.7	277.6	67	341.6	318.5	27	385.5	359.4	87	429.3	400.3
48	254.5	237.3	08	298.4	278.3	68	342.3	319.2	28	386.2	360.1	88	430.1	401.0
49	255.3	238.0	09	299.1	278.9	69	343.0	319.9	29	386.9	360.8	89	430.8	401.7
50	256.0	238.7	10	299.9	279.6	70	343.7	320.5	30	387.6	361.5	90	431.5	402.4
351	256.7	239.4	411	300.6	280.3	471	344.5	321.2	531	388.4	362.1	591	432.3	403.1
52	257.4	240.1	12	301.3	281.0	72	345.2	321.9	32	389.1	362.8	92	433.0	403.7
53	258.2	240.8	13	302.1	281.7	73	345.9	322.6	33	389.9	363.5	93	433.7	404.4
54	258.9	241.4	14	302.8	282.4	74	346.7	323.3	34	390.6	364.2	94	434.5	405.1
55	259.6	242.1	15	303.5	283.0	75	347.4	324.0	35	391.3	364.9	95	435.2	405.8
56	260.4	242.8	16	304.3	283.7	76	348.1	324.6	36	392.0	365.5	96	435.9	406.5
57	261.1	243.5	17	305.0	284.4	77	348.9	325.3	37	392.8	366.2	97	436.7	407.2
58	261.8	244.2	18	305.7	285.1	78	349.6	326.0	38	393.5	366.9	98	437.4	407.8
59	262.6	244.8	19	306.4	285.8	79	350.3	326.7	39	394.2	367.6	99	438.1	408.5
60	263.3	245.5	20	307.2	286.4	80	351.1	327.4	40	394.9	368.3	600	438.8	409.2
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

47° (133°, 227°, 313°).

TABLE 2.

Difference of Latitude and Departure for 44° (136°, 224°, 316°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.7	0.7	61	43.9	42.4	121	87.0	84.1	181	130.2	125.7	241	173.4	167.4
2	1.4	1.4	62	44.6	43.1	22	87.8	84.7	82	130.9	126.4	42	174.1	168.1
3	2.2	2.1	63	45.3	43.8	23	88.5	85.4	83	131.6	127.1	43	174.8	168.8
4	2.9	2.8	64	46.0	44.5	24	89.2	86.1	84	132.4	127.8	44	175.5	169.5
5	3.6	3.5	65	46.8	45.2	25	89.9	86.8	85	133.1	128.5	45	176.2	170.2
6	4.3	4.2	66	47.5	45.8	26	90.6	87.5	86	133.8	129.2	46	177.0	170.9
7	5.0	4.9	67	48.2	46.5	27	91.4	88.2	87	134.5	129.9	47	177.7	171.6
8	5.8	5.6	68	48.9	47.2	28	92.1	88.9	88	135.2	130.6	48	178.4	172.3
9	6.5	6.3	69	49.6	47.9	29	92.8	89.6	89	136.0	131.3	49	179.1	173.0
10	7.2	6.9	70	50.4	48.6	30	93.5	90.3	90	136.7	132.0	50	179.8	173.7
11	7.9	7.6	71	51.1	49.3	131	94.2	91.0	191	137.4	132.7	251	180.6	174.4
12	8.6	8.3	72	51.8	50.0	32	95.0	91.7	92	138.1	133.4	52	181.3	175.1
13	9.4	9.0	73	52.5	50.7	33	95.7	92.4	93	138.8	134.1	53	182.0	175.7
14	10.1	9.7	74	53.2	51.4	34	96.4	93.1	94	139.6	134.8	54	182.7	176.4
15	10.8	10.4	75	54.0	52.1	35	97.1	93.8	95	140.3	135.5	55	183.4	177.1
16	11.5	11.1	76	54.7	52.8	36	97.8	94.5	96	141.0	136.2	56	184.2	177.8
17	12.2	11.8	77	55.4	53.5	37	98.5	95.2	97	141.7	136.8	57	184.9	178.5
18	12.9	12.5	78	56.1	54.2	38	99.3	95.9	98	142.4	137.5	58	185.6	179.2
19	13.7	13.2	79	56.8	54.9	39	100.0	96.6	99	143.1	138.2	59	186.3	179.9
20	14.4	13.9	80	57.5	55.6	40	100.7	97.3	200	143.9	138.9	60	187.0	180.6
21	15.1	14.6	81	58.3	56.3	141	101.4	97.9	201	144.6	139.6	261	187.7	181.3
22	15.8	15.3	82	59.0	57.0	42	102.1	98.6	02	145.3	140.3	62	188.5	182.0
23	16.5	16.0	83	59.7	57.7	43	102.9	99.3	03	146.0	141.0	63	189.2	182.7
24	17.3	16.7	84	60.4	58.4	44	103.6	100.0	04	146.7	141.7	64	189.9	183.4
25	18.0	17.4	85	61.1	59.0	45	104.3	100.7	05	147.5	142.4	65	190.6	184.1
26	18.7	18.1	86	61.9	59.7	46	105.0	101.4	06	148.2	143.1	66	191.3	184.8
27	19.4	18.8	87	62.6	60.4	47	105.7	102.1	07	148.9	143.8	67	192.1	185.5
28	20.1	19.5	88	63.3	61.1	48	106.5	102.8	08	149.6	144.5	68	192.8	186.2
29	20.9	20.1	89	64.0	61.8	49	107.2	103.5	09	150.3	145.2	69	193.5	186.9
30	21.6	20.8	90	64.7	62.5	50	107.9	104.2	10	151.1	145.9	70	194.2	187.6
31	22.3	21.5	91	65.5	63.2	151	108.6	104.9	211	151.8	146.6	271	194.9	188.3
32	23.0	22.2	92	66.2	63.9	52	109.3	105.6	12	152.5	147.3	72	195.7	188.9
33	23.7	22.9	93	66.9	64.6	53	110.1	106.3	13	153.2	148.0	73	196.4	189.6
34	24.5	23.6	94	67.6	65.3	54	110.8	107.0	14	153.9	148.7	74	197.1	190.3
35	25.2	24.3	95	68.3	66.0	55	111.5	107.7	15	154.7	149.4	75	197.8	191.0
36	25.9	25.0	96	69.1	66.7	56	112.2	108.4	16	155.4	150.0	76	198.5	191.7
37	26.6	25.7	97	69.8	67.4	57	112.9	109.1	17	156.1	150.7	77	199.3	192.4
38	27.3	26.4	98	70.5	68.1	58	113.7	109.8	18	156.8	151.4	78	200.0	193.1
39	28.1	27.1	99	71.2	68.8	59	114.4	110.5	19	157.5	152.1	79	200.7	193.8
40	28.8	27.8	100	71.9	69.5	60	115.1	111.1	20	158.3	152.8	80	201.4	194.5
41	29.5	28.5	101	72.7	70.2	161	115.8	111.8	221	159.0	153.5	281	202.1	195.2
42	30.2	29.2	02	73.4	70.9	62	116.5	112.5	22	159.7	154.2	82	202.9	195.9
43	30.9	29.9	03	74.1	71.5	63	117.3	113.2	23	160.4	154.9	83	203.6	196.6
44	31.7	30.6	04	74.8	72.2	64	118.0	113.9	24	161.1	155.6	84	204.3	197.3
45	32.4	31.3	05	75.5	72.9	65	118.7	114.6	25	161.9	156.3	85	205.0	198.0
46	33.1	32.0	06	76.3	73.6	66	119.4	115.3	26	162.6	157.0	86	205.7	198.7
47	33.8	32.6	07	77.0	74.3	67	120.1	116.0	27	163.3	157.7	87	206.5	199.4
48	34.5	33.3	08	77.7	75.0	68	120.8	116.7	28	164.0	158.4	88	207.2	200.1
49	35.2	34.0	09	78.4	75.7	69	121.6	117.4	29	164.7	159.1	89	207.9	200.8
50	36.0	34.7	10	79.1	76.4	70	122.3	118.1	30	165.4	159.8	90	208.6	201.5
51	36.7	35.4	111	79.8	77.1	171	123.0	118.8	231	166.2	160.5	291	209.3	202.1
52	37.4	36.1	12	80.6	77.8	72	123.7	119.5	32	166.9	161.2	92	210.0	202.8
53	38.1	36.8	13	81.3	78.5	73	124.4	120.2	33	167.6	161.9	93	210.8	203.5
54	38.8	37.5	14	82.0	79.2	74	125.2	120.9	34	168.3	162.6	94	211.5	204.2
55	39.6	38.2	15	82.7	79.9	75	125.9	121.6	35	169.0	163.2	95	212.2	204.9
56	40.3	38.9	16	83.4	80.6	76	126.6	122.3	36	169.8	163.9	96	212.9	205.6
57	41.0	39.6	17	84.2	81.3	77	127.3	123.0	37	170.5	164.6	97	213.6	206.3
58	41.7	40.3	18	84.9	82.0	78	128.0	123.6	38	171.2	165.3	98	214.4	207.0
59	42.4	41.0	19	85.6	82.7	79	128.8	124.3	39	171.9	166.0	99	215.1	207.7
60	43.2	41.7	20	86.3	83.4	80	129.5	125.0	40	172.6	166.7	300	215.8	208.4
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

46° (134°, 226°, 314°).

TABLE 2.

Difference of Latitude and Departure for 44° (136°, 224°, 316°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	216.5	209.1	361	259.7	250.8	421	302.8	292.5	481	346.0	334.1	541	389.2	375.8
02	217.2	209.8	62	260.4	251.5	22	303.6	293.2	82	346.7	334.8	42	389.9	376.5
03	218.0	210.5	63	261.1	252.2	23	304.3	293.8	83	347.4	335.5	43	390.6	377.2
04	218.7	211.2	64	261.8	252.9	24	305.0	294.5	84	348.2	336.2	44	391.3	377.9
05	219.4	211.9	65	262.6	253.6	25	305.7	295.2	85	348.9	336.9	45	392.0	378.6
06	220.1	212.6	66	263.3	254.3	26	306.4	295.9	86	349.6	337.6	46	392.8	379.3
07	220.8	213.3	67	264.0	254.9	27	307.2	296.6	87	350.3	338.3	47	393.5	380.0
08	221.6	214.0	68	264.7	255.6	28	307.9	297.3	88	351.0	339.0	48	394.2	380.7
09	222.3	214.7	69	265.4	256.3	29	308.6	298.0	89	351.7	339.7	49	394.9	381.4
10	223.0	215.4	70	266.2	257.0	30	309.3	298.7	90	352.5	340.4	50	395.6	382.1
311	223.7	216.0	371	266.9	257.7	431	310.0	299.4	491	353.2	341.1	551	396.4	382.7
12	224.4	216.7	72	267.6	258.4	32	310.8	300.1	92	353.9	341.8	52	397.1	383.4
13	225.2	217.4	73	268.3	259.1	33	311.5	300.8	93	354.6	342.5	53	397.8	384.1
14	225.9	218.1	74	269.0	259.8	34	312.2	301.5	94	355.3	343.2	54	398.5	384.8
15	226.6	218.8	75	269.8	260.5	35	312.9	302.2	95	356.1	343.9	55	399.2	385.5
16	227.3	219.5	76	270.5	261.2	36	313.6	302.9	96	356.8	344.6	56	400.0	386.2
17	228.0	220.2	77	271.2	261.9	37	314.4	303.6	97	357.5	345.2	57	400.7	386.9
18	228.8	220.9	78	271.9	262.6	38	315.1	304.3	98	358.2	345.9	58	401.4	387.6
19	229.5	221.6	79	272.6	263.3	39	315.8	305.0	99	358.9	346.6	59	402.1	388.3
20	230.2	222.3	80	273.4	264.0	40	316.5	305.7	500	359.7	347.3	60	402.8	389.0
321	230.9	223.0	381	274.1	264.7	441	317.2	306.4	501	360.4	348.0	561	403.6	389.7
22	231.6	223.7	82	274.8	265.4	42	318.0	307.0	02	361.1	348.7	62	404.3	390.4
23	232.3	224.4	83	275.5	266.1	43	318.7	307.7	03	361.8	349.4	63	405.0	391.1
24	233.1	225.1	84	276.2	266.8	44	319.4	308.4	04	362.5	350.1	64	405.7	391.8
25	233.8	225.8	85	276.9	267.5	45	320.1	309.1	05	363.3	350.8	65	406.4	392.5
26	234.5	226.5	86	277.7	268.1	46	320.8	309.8	06	364.0	351.5	66	407.2	393.2
27	235.2	227.2	87	278.4	268.8	47	321.5	310.5	07	364.7	352.2	67	407.9	393.9
28	235.9	227.9	88	279.1	269.5	48	322.3	311.2	08	365.4	352.9	68	408.6	394.6
29	236.7	228.6	89	279.8	270.2	49	323.0	311.9	09	366.1	353.6	69	409.3	395.3
30	237.4	229.2	90	280.5	270.9	50	323.7	312.6	10	366.9	354.3	70	410.0	396.0
331	238.1	229.9	391	281.3	271.6	451	324.4	313.3	511	367.6	355.0	571	410.7	396.7
32	238.8	230.6	92	282.0	272.3	52	325.2	314.0	12	368.3	355.7	72	411.5	397.3
33	239.5	231.3	93	282.7	273.0	53	325.9	314.7	13	369.0	356.4	73	412.2	398.0
34	240.3	232.0	94	283.4	273.7	54	326.6	315.4	14	369.7	357.1	74	412.9	398.7
35	241.0	232.7	95	284.1	274.4	55	327.3	316.1	15	370.5	357.8	75	413.6	399.4
36	241.7	233.4	96	284.9	275.1	56	328.0	316.8	16	371.2	358.4	76	414.3	400.1
37	242.4	234.1	97	285.6	275.8	57	328.7	317.5	17	371.9	359.1	77	415.1	400.8
38	243.1	234.8	98	286.3	276.5	58	329.5	318.2	18	372.6	359.8	78	415.8	401.5
39	243.9	235.5	99	287.0	277.2	59	330.2	318.9	19	373.3	360.5	79	416.5	402.2
40	244.6	236.2	400	287.7	277.9	60	330.9	319.6	20	374.1	361.2	80	417.2	402.9
341	245.3	236.9	401	288.5	278.6	461	331.6	320.2	521	374.8	361.9	581	417.9	403.6
42	246.0	237.6	02	289.2	279.3	62	332.3	320.9	22	375.5	362.6	82	418.7	404.3
43	246.7	238.3	03	289.9	280.0	63	333.1	321.6	23	376.2	363.3	83	419.4	405.0
44	247.5	239.0	04	290.6	280.7	64	333.8	322.3	24	376.9	364.0	84	420.1	405.7
45	248.2	239.7	05	291.3	281.3	65	334.5	323.0	25	377.7	364.7	85	420.8	406.4
46	248.9	240.4	06	292.1	282.0	66	335.2	323.7	26	378.4	365.4	86	421.5	407.1
47	249.6	241.1	07	292.8	282.7	67	335.9	324.4	27	379.1	366.1	87	422.3	407.8
48	250.3	241.7	08	293.5	283.4	68	336.7	325.1	28	379.8	366.8	88	423.0	408.5
49	251.1	242.4	09	294.2	284.1	69	337.4	325.8	29	380.5	367.5	89	423.7	409.1
50	251.8	243.1	10	294.9	284.8	70	338.1	326.5	30	381.2	368.2	90	424.4	409.9
351	252.5	243.8	411	295.7	285.5	471	338.8	327.2	531	382.0	368.9	591	425.1	410.5
52	253.2	244.5	12	296.4	286.2	72	339.5	327.9	32	382.7	369.6	92	425.9	411.2
53	253.9	245.2	13	297.1	286.9	73	340.3	328.6	33	383.4	370.3	93	426.6	411.9
54	254.6	245.9	14	297.8	287.6	74	341.0	329.3	34	384.1	371.0	94	427.3	412.6
55	255.4	246.6	15	298.5	288.3	75	341.7	330.0	35	384.8	371.7	95	428.0	413.3
56	256.1	247.3	16	299.2	289.0	76	342.4	330.7	36	385.6	372.4	96	428.7	414.0
57	256.8	248.0	17	300.0	289.7	77	343.1	331.4	37	386.3	373.1	97	429.5	414.7
58	257.5	248.7	18	300.7	290.4	78	343.8	332.1	38	387.0	373.7	98	430.2	415.4
59	258.2	249.4	19	301.4	291.1	79	344.6	332.7	39	387.7	374.4	99	430.9	416.1
60	259.0	250.1	20	302.1	291.8	80	345.3	333.4	40	388.4	375.1	600	431.6	416.8
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

46° (134°, 226°, 314°).

TABLE 2.

Difference of Latitude and Departure for 45° (135°, 225°, 315°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
1	0.7	0.7	61	43.1	43.1	121	85.6	85.6	181	128.0	128.0	241	170.4	170.4
2	1.4	1.4	62	43.8	43.8	22	86.3	86.3	82	128.7	128.7	42	171.1	171.1
3	2.1	2.1	63	44.5	44.5	23	87.0	87.0	83	129.4	129.4	43	171.8	171.8
4	2.8	2.8	64	45.3	45.3	24	87.7	87.7	84	130.1	130.1	44	172.5	172.5
5	3.5	3.5	65	46.0	46.0	25	88.4	88.4	85	130.8	130.8	45	173.2	173.2
6	4.2	4.2	66	46.7	46.7	26	89.1	89.1	86	131.5	131.5	46	173.9	173.9
7	4.9	4.9	67	47.4	47.4	27	89.8	89.8	87	132.2	132.2	47	174.7	174.7
8	5.7	5.7	68	48.1	48.1	28	90.5	90.5	88	132.9	132.9	48	175.4	175.4
9	6.4	6.4	69	48.8	48.8	29	91.2	91.2	89	133.6	133.6	49	176.1	176.1
10	7.1	7.1	70	49.5	49.5	30	91.9	91.9	90	134.4	134.4	50	176.8	176.8
11	7.8	7.8	71	50.2	50.2	131	92.6	92.6	191	135.1	135.1	251	177.5	177.5
12	8.5	8.5	72	50.9	50.9	32	93.3	93.3	92	135.8	135.8	52	178.2	178.2
13	9.2	9.2	73	51.6	51.6	33	94.0	94.0	93	136.5	136.5	53	178.9	178.9
14	9.9	9.9	74	52.3	52.3	34	94.8	94.8	94	137.2	137.2	54	179.6	179.6
15	10.6	10.6	75	53.0	53.0	35	95.5	95.5	95	137.9	137.9	55	180.3	180.3
16	11.3	11.3	76	53.7	53.7	36	96.2	96.2	96	138.6	138.6	56	181.0	181.0
17	12.0	12.0	77	54.4	54.4	37	96.9	96.9	97	139.3	139.3	57	181.7	181.7
18	12.7	12.7	78	55.2	55.2	38	97.6	97.6	98	140.0	140.0	58	182.4	182.4
19	13.4	13.4	79	55.9	55.9	39	98.3	98.3	99	140.7	140.7	59	183.1	183.1
20	14.1	14.1	80	56.6	56.6	40	99.0	99.0	200	141.4	141.4	60	183.8	183.8
21	14.8	14.8	81	57.3	57.3	141	99.7	99.7	201	142.1	142.1	261	184.6	184.6
22	15.6	15.6	82	58.0	58.0	42	100.4	100.4	02	142.8	142.8	62	185.3	185.3
23	16.3	16.3	83	58.7	58.7	43	101.1	101.1	03	143.5	143.5	63	186.0	186.0
24	17.0	17.0	84	59.4	59.4	44	101.8	101.8	04	144.2	144.2	64	186.7	186.7
25	17.7	17.7	85	60.1	60.1	45	102.5	102.5	05	145.0	145.0	65	187.4	187.4
26	18.4	18.4	86	60.8	60.8	46	103.2	103.2	06	145.7	145.7	66	188.1	188.1
27	19.1	19.1	87	61.5	61.5	47	103.9	103.9	07	146.4	146.4	67	188.8	188.8
28	19.8	19.8	88	62.2	62.2	48	104.7	104.7	08	147.1	147.1	68	189.5	189.5
29	20.5	20.5	89	62.9	62.9	49	105.4	105.4	09	147.8	147.8	69	190.2	190.2
30	21.2	21.2	90	63.6	63.6	50	106.1	106.1	10	148.5	148.5	70	190.9	190.9
31	21.9	21.9	91	64.3	64.3	151	106.8	106.8	211	149.2	149.2	271	191.6	191.6
32	22.6	22.6	92	65.1	65.1	52	107.5	107.5	12	149.9	149.9	72	192.3	192.3
33	23.3	23.3	93	65.8	65.8	53	108.2	108.2	13	150.6	150.6	73	193.0	193.0
34	24.0	24.0	94	66.5	66.5	54	108.9	108.9	14	151.3	151.3	74	193.7	193.7
35	24.7	24.7	95	67.2	67.2	55	109.6	109.6	15	152.0	152.0	75	194.5	194.5
36	25.5	25.5	96	67.9	67.9	56	110.3	110.3	16	152.7	152.7	76	195.2	195.2
37	26.2	26.2	97	68.6	68.6	57	111.0	111.0	17	153.4	153.4	77	195.9	195.9
38	26.9	26.9	98	69.3	69.3	58	111.7	111.7	18	154.1	154.1	78	196.6	196.6
39	27.6	27.6	99	70.0	70.0	59	112.4	112.4	19	154.9	154.9	79	197.3	197.3
40	28.3	28.3	100	70.7	70.7	60	113.1	113.1	20	155.6	155.6	80	198.0	198.0
41	29.0	29.0	101	71.4	71.4	161	113.8	113.8	221	156.3	156.3	281	198.7	198.7
42	29.7	29.7	02	72.1	72.1	62	114.6	114.6	22	157.0	157.0	82	199.4	199.4
43	30.4	30.4	03	72.8	72.8	63	115.3	115.3	23	157.7	157.7	83	200.1	200.1
44	31.1	31.1	04	73.5	73.5	64	116.0	116.0	24	158.4	158.4	84	200.8	200.8
45	31.8	31.8	05	74.2	74.2	65	116.7	116.7	25	159.1	159.1	85	201.5	201.5
46	32.5	32.5	06	75.0	75.0	66	117.4	117.4	26	159.8	159.8	86	202.2	202.2
47	33.2	33.2	07	75.7	75.7	67	118.1	118.1	27	160.5	160.5	87	202.9	202.9
48	33.9	33.9	08	76.4	76.4	68	118.8	118.8	28	161.2	161.2	88	203.6	203.6
49	34.6	34.6	09	77.1	77.1	69	119.5	119.5	29	161.9	161.9	89	204.4	204.4
50	35.4	35.4	10	77.8	77.8	70	120.2	120.2	30	162.6	162.6	90	205.1	205.1
51	36.1	36.1	111	78.5	78.5	171	120.9	120.9	231	163.3	163.3	291	205.8	205.8
52	36.8	36.8	12	79.2	79.2	72	121.6	121.6	32	164.0	164.0	92	206.5	206.5
53	37.5	37.5	13	79.9	79.9	73	122.3	122.3	33	164.8	164.8	93	207.2	207.2
54	38.2	38.2	14	80.6	80.6	74	123.0	123.0	34	165.5	165.5	94	207.9	207.9
55	38.9	38.9	15	81.3	81.3	75	123.7	123.7	35	166.2	166.2	95	208.6	208.6
56	39.6	39.6	16	82.0	82.0	76	124.5	124.5	36	166.9	166.9	96	209.3	209.3
57	40.3	40.3	17	82.7	82.7	77	125.2	125.2	37	167.6	167.6	97	210.0	210.0
58	41.0	41.0	18	83.4	83.4	78	125.9	125.9	38	168.3	168.3	98	210.7	210.7
59	41.7	41.7	19	84.1	84.1	79	126.6	126.6	39	169.0	169.0	99	211.4	211.4
60	42.4	42.4	20	84.9	84.9	80	127.3	127.3	40	169.7	169.7	300	212.1	212.1
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

45° (135°, 225°, 315°).

TABLE 2.

Difference of Latitude and Departure for 45° (135°, 225°, 315°).

Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.	Dist.	Lat.	Dep.
301	212.8	212.8	361	255.3	255.3	421	297.7	297.7	481	340.1	340.1	541	382.5	382.5
02	213.5	213.5	62	256.0	256.0	22	298.4	298.4	82	340.8	340.8	42	383.2	383.2
03	214.3	214.3	63	256.7	256.7	23	299.1	299.1	83	341.5	341.5	43	383.9	383.9
04	215.0	215.0	64	257.4	257.4	24	299.8	299.8	84	342.2	342.2	44	384.7	384.7
05	215.7	215.7	65	258.1	258.1	25	300.5	300.5	85	342.9	342.9	45	385.4	385.4
06	216.4	216.4	66	258.8	258.8	26	301.2	301.2	86	343.6	343.6	46	386.1	386.1
07	217.1	217.1	67	259.5	259.5	27	301.9	301.9	87	344.3	344.3	47	386.8	386.8
08	217.8	217.8	68	260.2	260.2	28	302.6	302.6	88	345.1	345.1	48	387.5	387.5
09	218.5	218.5	69	260.9	260.9	29	303.4	303.4	89	345.8	345.8	49	388.2	388.2
10	219.2	219.2	70	261.6	261.6	30	304.1	304.1	90	346.5	346.5	50	388.9	388.9
311	219.9	219.9	371	262.3	262.3	431	304.8	304.8	491	347.2	347.2	551	389.6	389.6
12	220.6	220.6	72	263.0	263.0	32	305.5	305.5	92	347.9	347.9	52	390.3	390.3
13	221.3	221.3	73	263.8	263.8	33	306.2	306.2	93	348.6	348.6	53	391.0	391.0
14	222.0	222.0	74	264.5	264.5	34	306.9	306.9	94	349.3	349.3	54	391.7	391.7
15	222.7	222.7	75	265.2	265.2	35	307.6	307.6	95	350.0	350.0	55	392.4	392.4
16	223.4	223.4	76	265.9	265.9	36	308.3	308.3	96	350.7	350.7	56	393.1	393.1
17	224.2	224.2	77	266.6	266.6	37	309.0	309.0	97	351.4	351.4	57	393.9	393.9
18	224.9	224.9	78	267.3	267.3	38	309.7	309.7	98	352.1	352.1	58	394.6	394.6
19	225.6	225.6	79	268.0	268.0	39	310.4	310.4	99	352.8	352.8	59	395.3	395.3
20	226.3	226.3	80	268.7	268.7	40	311.1	311.1	500	353.5	353.5	60	396.0	396.0
321	227.0	227.0	381	269.4	269.4	441	311.8	311.8	501	354.3	354.3	561	396.7	396.7
22	227.7	227.7	82	270.1	270.1	42	312.5	312.5	02	355.0	355.0	62	397.4	397.4
23	228.4	228.4	83	270.8	270.8	43	313.3	313.3	03	355.7	355.7	63	398.1	398.1
24	229.1	229.1	84	271.5	271.5	44	314.0	314.0	04	356.4	356.4	64	398.8	398.8
25	229.8	229.8	85	272.2	272.2	45	314.7	314.7	05	357.1	357.1	65	399.5	399.5
26	230.5	230.5	86	272.9	272.9	46	315.4	315.4	06	357.8	357.8	66	400.2	400.2
27	231.2	231.2	87	273.7	273.7	47	316.1	316.1	07	358.5	358.5	67	400.9	400.9
28	231.9	231.9	88	274.4	274.4	48	316.8	316.8	08	359.2	359.2	68	401.6	401.6
29	232.6	232.6	89	275.1	275.1	49	317.5	317.5	09	359.9	359.9	69	402.3	402.3
30	233.3	233.3	90	275.8	275.8	50	318.2	318.2	10	360.6	360.6	70	403.0	403.0
331	234.1	234.1	391	276.5	276.5	451	318.9	318.9	511	361.3	361.3	571	403.8	403.8
32	234.8	234.8	92	277.2	277.2	52	319.6	319.6	12	362.0	362.0	72	404.5	404.5
33	235.5	235.5	93	277.9	277.9	53	320.3	320.3	13	362.7	362.7	73	405.2	405.2
34	236.2	236.2	94	278.6	278.6	54	321.0	321.0	14	363.5	363.5	74	405.9	405.9
35	236.9	236.9	95	279.3	279.3	55	321.7	321.7	15	364.2	364.2	75	406.6	406.6
36	237.6	237.6	96	280.0	280.0	56	322.4	322.4	16	364.9	364.9	76	407.3	407.3
37	238.3	238.3	97	280.7	280.7	57	323.2	323.2	17	365.6	365.6	77	408.0	408.0
38	239.0	239.0	98	281.4	281.4	58	323.9	323.9	18	366.3	366.3	78	408.7	408.7
39	239.7	239.7	99	282.1	282.1	59	324.6	324.6	19	367.0	367.0	79	409.4	409.4
40	240.4	240.4	400	282.8	282.8	60	325.3	325.3	20	367.7	367.7	80	410.1	410.1
341	241.1	241.1	401	283.6	283.6	461	326.0	326.0	521	368.4	368.4	581	410.8	410.8
42	241.8	241.8	02	284.3	284.3	62	326.7	326.7	22	369.1	369.1	82	411.5	411.5
43	242.5	242.5	03	285.0	285.0	63	327.4	327.4	23	369.8	369.8	83	412.2	412.2
44	243.2	243.2	04	285.7	285.7	64	328.1	328.1	24	370.5	370.5	84	412.9	412.9
45	244.0	244.0	05	286.4	286.4	65	328.8	328.8	25	371.2	371.2	85	413.7	413.7
46	244.7	244.7	06	287.1	287.1	66	329.5	329.5	26	371.9	371.9	86	414.4	414.4
47	245.4	245.4	07	287.8	287.8	67	330.2	330.2	27	372.6	372.6	87	415.1	415.1
48	246.1	246.1	08	288.5	288.5	68	330.9	330.9	28	373.4	373.4	88	415.8	415.8
49	246.8	246.8	09	289.2	289.2	69	331.6	331.6	29	374.1	374.1	89	416.5	416.5
50	247.5	247.5	10	289.9	289.9	70	332.3	332.3	30	374.8	374.8	90	417.2	417.2
351	248.2	248.2	411	290.6	290.6	471	333.1	333.1	531	375.5	375.5	591	417.9	417.9
52	248.9	248.9	12	291.3	291.3	72	333.8	333.8	32	376.2	376.2	92	418.6	418.6
53	249.6	249.6	13	292.0	292.0	73	334.5	334.5	33	376.9	376.9	93	419.3	419.3
54	250.3	250.3	14	292.7	292.7	74	335.2	335.2	34	377.6	377.6	94	420.0	420.0
55	251.0	251.0	15	293.5	293.5	75	335.9	335.9	35	378.3	378.3	95	420.7	420.7
56	251.7	251.7	16	294.2	294.2	76	336.6	336.6	36	379.0	379.0	96	421.4	421.4
57	252.4	252.4	17	294.9	294.9	77	337.3	337.3	37	379.7	379.7	97	422.1	422.1
58	253.1	253.1	18	295.6	295.6	78	338.0	338.0	38	380.4	380.4	98	422.8	422.8
59	253.9	253.9	19	296.3	296.3	79	338.7	338.7	39	381.1	381.1	99	423.6	423.6
60	254.6	254.6	20	297.0	297.0	80	339.4	339.4	40	381.8	381.8	600	424.3	424.3
Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.	Dist.	Dep.	Lat.

45° (135°, 225°, 315°).

TABLE 3.

Meridional Parts, or Increased Latitudes.

Comp. $\frac{1}{293.465}$

M.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	M.
0	0.0	59.6	119.2	178.9	238.6	298.3	358.2	418.2	478.3	538.6	0
1	1.0	60.6	20.2	79.9	39.6	99.3	59.2	19.2	79.3	39.6	1
2	2.0	61.6	21.2	80.8	40.6	300.3	60.2	20.2	80.3	40.6	2
3	3.0	62.6	22.2	81.8	41.6	01.3	61.2	21.2	81.3	41.6	3
4	4.0	63.6	23.2	82.8	42.5	02.3	62.2	22.2	82.3	42.6	4
5	5.0	64.6	124.2	183.8	243.5	303.3	363.2	423.2	483.3	543.6	5
6	6.0	65.6	25.2	84.8	44.5	04.3	64.2	24.2	84.3	44.6	6
7	7.0	66.5	26.2	85.8	45.5	05.3	65.2	25.2	85.3	45.6	7
8	7.9	67.5	27.2	86.8	46.5	06.3	66.2	26.2	86.3	46.6	8
9	8.9	68.5	28.2	87.8	47.5	07.3	67.2	27.2	87.3	47.6	9
10	9.9	69.5	129.1	188.8	248.5	308.3	368.2	428.2	488.3	548.6	10
11	10.9	70.5	30.1	89.8	49.5	09.3	69.2	29.2	89.3	49.6	11
12	11.9	71.5	31.1	90.8	50.5	10.3	70.2	30.2	90.4	50.6	12
13	12.9	72.5	32.1	91.8	51.5	11.3	71.2	31.2	91.4	51.7	13
14	13.9	73.5	33.1	92.8	52.5	12.3	72.2	32.2	92.4	52.7	14
15	14.9	74.5	134.1	193.8	253.5	313.3	373.2	433.2	493.4	553.7	15
16	15.9	75.5	35.1	94.8	54.5	14.3	74.2	34.2	94.4	54.7	16
17	16.9	76.5	36.1	95.8	55.5	15.3	75.2	35.2	95.4	55.7	17
18	17.9	77.5	37.1	96.8	56.5	16.3	76.2	36.2	96.4	56.7	18
19	18.9	78.5	38.1	97.8	57.5	17.3	77.2	37.2	97.4	57.7	19
20	19.9	79.5	139.1	198.8	258.5	318.3	378.2	438.2	498.4	558.7	20
21	20.9	80.5	40.1	99.7	59.5	19.3	79.2	39.2	99.4	59.7	21
22	21.9	81.5	41.1	200.7	60.5	20.3	80.2	40.2	500.4	60.7	22
23	22.8	82.4	42.1	01.7	61.5	21.3	81.2	41.2	01.4	61.7	23
24	23.8	83.4	43.1	02.7	62.5	22.3	82.2	42.2	02.4	62.7	24
25	24.8	84.4	144.1	203.7	263.5	323.3	383.2	443.2	503.4	563.7	25
26	25.8	85.4	45.1	04.7	64.5	24.3	84.2	44.2	04.4	64.7	26
27	26.8	86.4	46.0	05.7	65.5	25.3	85.2	45.2	05.4	65.7	27
28	27.8	87.4	47.0	06.7	66.5	26.3	86.2	46.2	06.4	66.8	28
29	28.8	88.4	48.0	07.7	67.4	27.3	87.2	47.2	07.4	67.8	29
30	29.8	89.4	149.0	208.7	268.4	328.3	388.2	448.2	508.4	568.8	30
31	30.8	90.4	50.0	09.7	69.4	29.3	89.2	49.2	09.4	69.8	31
32	31.8	91.4	51.0	10.7	70.4	30.3	90.2	50.2	10.4	70.8	32
33	32.8	92.4	52.0	11.7	71.4	31.3	91.2	51.2	11.4	71.8	33
34	33.8	93.4	53.0	12.7	72.4	32.3	92.2	52.2	12.4	72.8	34
35	34.8	94.4	154.0	213.7	273.4	333.3	393.2	453.2	513.4	573.8	35
36	35.8	95.4	55.0	14.7	74.4	34.3	94.2	54.3	14.5	74.8	36
37	36.7	96.4	56.0	15.7	75.4	35.3	95.2	55.3	15.5	75.8	37
38	37.7	97.3	57.0	16.7	76.4	36.2	96.2	56.3	16.5	76.8	38
39	38.7	98.3	58.0	17.7	77.4	37.2	97.2	57.3	17.5	77.8	39
40	39.7	99.3	159.0	218.7	278.4	338.2	398.2	458.3	518.5	578.8	40
41	40.7	100.3	60.0	19.7	79.4	39.2	99.2	59.3	19.5	79.9	41
42	41.7	01.3	61.0	20.6	80.4	40.2	400.2	60.3	20.5	80.9	42
43	42.7	02.3	62.0	21.6	81.4	41.2	01.2	61.3	21.5	81.9	43
44	43.7	03.3	63.0	22.6	82.4	42.2	02.2	62.3	22.5	82.9	44
45	44.7	104.3	164.0	223.6	283.4	343.2	403.2	463.3	523.5	583.9	45
46	45.7	05.3	65.0	24.6	84.4	44.2	04.2	64.3	24.5	84.9	46
47	46.7	06.3	66.0	25.6	85.4	45.2	05.2	65.3	25.5	85.9	47
48	47.7	07.3	67.0	26.6	86.4	46.2	06.2	66.3	26.5	86.9	48
49	48.7	08.3	68.0	27.6	87.4	47.2	07.2	67.3	27.5	87.9	49
50	49.7	109.3	168.9	228.6	288.4	348.2	408.2	468.3	528.5	588.9	50
51	50.7	10.3	69.9	29.6	89.4	49.2	09.2	69.3	29.5	89.9	51
52	51.6	11.3	70.9	30.6	90.4	50.2	10.2	70.3	30.5	90.9	52
53	52.6	12.3	71.9	31.6	91.4	51.2	11.2	71.3	31.5	91.9	53
54	53.6	13.2	72.9	32.6	92.4	52.2	12.2	72.3	32.5	93.0	54
55	54.6	114.2	173.9	233.6	293.4	353.2	413.2	473.3	533.5	594.0	55
56	55.6	15.2	74.9	34.6	94.4	54.2	14.2	74.3	34.6	95.0	56
57	56.6	16.2	75.9	35.6	95.4	55.2	15.2	75.3	35.6	96.0	57
58	57.6	17.2	76.9	36.6	96.3	56.2	16.2	76.3	36.6	97.0	58
59	58.6	18.2	77.9	37.6	97.3	57.2	17.2	77.3	37.6	98.0	59
M.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	M.

TABLE 3.

Meridional Parts, or Increased Latitudes.

Comp. $\frac{1}{293.465}$

M.	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	M.
0	599.0	659.6	720.5	781.5	842.8	904.4	966.3	1028.5	1091.0	1153.9	0
1	600.0	60.6	21.5	82.5	43.9	05.4	67.3	29.5	92.0	54.9	1
2	01.0	61.7	22.5	83.6	44.9	06.5	68.3	30.5	93.1	56.0	2
3	02.0	62.7	23.5	84.6	45.9	07.5	69.4	31.6	94.1	57.0	3
4	03.0	63.7	24.5	85.6	46.9	08.5	70.4	32.6	95.2	58.1	4
5	604.1	664.7	725.5	786.6	847.9	909.6	971.4	1033.7	1096.2	1159.1	5
6	05.1	65.7	26.6	87.6	49.0	10.6	72.5	34.7	97.3	60.2	6
7	06.1	66.7	27.6	88.7	50.0	11.6	73.5	35.7	98.3	61.2	7
8	07.1	67.7	28.6	89.7	51.0	12.6	74.6	36.8	99.4	62.3	8
9	08.1	68.7	29.6	90.7	52.0	13.7	75.6	37.8	1100.4	63.3	9
10	609.1	669.8	730.6	791.7	853.1	914.7	976.6	1038.9	1101.4	1164.4	10
11	10.1	70.8	31.6	92.7	54.1	15.7	77.7	39.9	02.5	65.4	11
12	11.1	71.8	32.7	93.8	55.1	16.8	78.7	40.9	03.5	66.5	12
13	12.1	72.8	33.7	94.8	56.1	17.8	79.7	42.0	04.6	67.5	13
14	13.1	73.8	34.7	95.8	57.2	18.8	80.8	43.0	05.6	68.6	14
15	614.1	674.8	735.7	796.8	858.2	919.8	981.8	1044.1	1106.7	1169.7	15
16	15.2	75.8	36.7	97.8	59.2	20.9	82.8	45.1	07.7	70.7	16
17	16.2	76.8	37.7	98.9	60.2	21.9	83.9	46.1	08.8	71.8	17
18	17.2	77.9	38.8	99.9	61.3	22.9	84.9	47.2	09.8	72.8	18
19	18.2	78.9	39.8	800.9	62.3	24.0	85.9	48.2	10.9	73.9	19
20	619.2	679.9	740.8	801.9	863.3	925.0	987.0	1049.3	1111.9	1174.9	20
21	20.2	80.9	41.8	02.9	64.3	26.0	88.0	50.3	13.0	76.0	21
22	21.2	81.9	42.8	04.0	65.4	27.1	89.0	51.3	14.0	77.0	22
23	22.2	82.9	43.8	05.0	66.4	28.1	90.1	52.4	15.0	78.1	23
24	23.2	83.9	44.9	06.0	67.4	29.1	91.1	53.4	16.1	79.1	24
25	624.2	684.9	745.9	807.0	868.5	930.1	992.1	1054.5	1117.1	1180.2	25
26	25.3	86.0	46.9	08.1	69.5	31.2	93.2	55.5	18.2	81.2	26
27	26.3	87.0	47.9	09.1	70.5	32.2	94.2	56.6	19.2	82.3	27
28	27.3	88.0	48.9	10.1	71.5	33.2	95.3	57.6	20.3	83.3	28
29	28.3	89.0	49.9	11.1	72.6	34.3	96.3	58.6	21.3	84.4	29
30	629.3	690.0	751.0	812.1	873.6	935.3	997.3	1059.7	1122.4	1185.5	30
31	30.3	91.0	52.0	13.2	74.6	36.3	98.4	60.7	23.4	86.5	31
32	31.3	92.0	53.0	14.2	75.6	37.4	99.4	61.8	24.5	87.6	32
33	32.3	93.1	54.0	15.2	76.7	38.4	1000.4	62.8	25.5	88.6	33
34	33.3	94.1	55.0	16.2	77.7	39.4	01.5	63.9	26.6	89.7	34
35	634.3	695.1	756.0	817.3	878.7	940.5	1002.5	1064.9	1127.6	1190.7	35
36	35.4	96.1	57.1	18.3	79.7	41.5	03.6	65.9	28.7	91.8	36
37	36.4	97.1	58.1	19.3	80.8	42.5	04.6	67.0	29.7	92.8	37
38	37.4	98.1	59.1	20.3	81.8	43.6	05.6	68.0	30.8	93.9	38
39	38.4	99.1	60.1	21.3	82.8	44.6	06.7	69.1	31.8	95.0	39
40	639.4	700.2	761.1	822.4	883.8	945.6	1007.7	1070.1	1132.9	1196.0	40
41	40.4	01.2	62.2	23.4	84.9	46.7	08.7	71.2	33.9	97.1	41
42	41.4	02.2	63.2	24.4	85.9	47.7	09.8	72.2	35.0	98.1	42
43	42.4	03.2	64.2	25.4	86.9	48.7	10.8	73.2	36.0	99.2	43
44	43.4	04.2	65.2	26.5	88.0	49.7	11.8	74.3	37.1	1200.2	44
45	644.5	705.2	766.2	827.5	889.0	950.8	1012.9	1075.3	1138.1	1201.3	45
46	45.5	06.2	67.3	28.5	90.0	51.8	13.9	76.4	39.2	02.3	46
47	46.5	07.3	68.3	29.5	91.0	52.8	15.0	77.4	40.2	03.4	47
48	47.5	08.3	69.3	30.5	92.1	53.9	16.0	78.5	41.3	04.5	48
49	48.5	09.3	70.3	31.6	93.1	54.9	17.0	79.5	42.3	05.5	49
50	649.5	710.3	771.3	832.6	894.1	955.9	1018.1	1080.5	1143.4	1206.6	50
51	50.5	11.3	72.3	33.6	95.2	57.0	19.1	81.6	44.4	07.6	51
52	51.5	12.3	73.4	34.6	96.2	58.0	20.2	82.6	45.5	08.7	52
53	52.5	13.4	74.4	35.7	97.2	59.0	21.2	83.7	46.5	09.7	53
54	53.6	14.4	75.4	36.7	98.2	60.1	22.2	84.7	47.6	10.8	54
55	654.6	715.4	776.4	837.7	899.3	961.1	1023.3	1085.8	1148.6	1211.8	55
56	55.6	16.4	77.4	38.7	900.3	62.1	24.3	86.8	49.7	12.9	56
57	56.6	17.4	78.5	39.8	01.3	63.2	25.3	87.9	50.7	14.0	57
58	57.6	18.4	79.5	40.8	02.3	64.2	26.4	88.9	51.8	15.0	58
59	58.6	19.4	80.5	41.8	03.4	65.2	27.4	89.9	52.8	16.1	59
M.	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	M.

TABLE 3.

Meridional Parts, or Increased Latitudes.

Comp. $\frac{1}{298.465}$

M.	20°	21°	22°	23°	24°	25°	26°	27°	28°	29°	M.
0	1217.1	1280.8	1344.9	1409.5	1474.5	1540.1	1606.2	1672.9	1740.2	1808.1	0
1	18.2	81.9	46.0	10.6	75.6	41.2	07.3	74.0	41.3	09.2	1
2	19.3	82.9	47.1	11.6	76.7	42.3	08.4	75.1	42.4	10.4	2
3	20.3	84.0	48.1	12.7	77.8	43.4	09.5	76.2	43.6	11.5	3
4	21.4	85.1	49.2	13.8	78.9	44.5	10.6	77.4	44.7	12.6	4
5	1222.4	1286.1	1350.3	1414.9	1480.0	1545.6	1611.7	1678.5	1745.8	1813.8	5
6	23.5	87.2	51.4	16.0	81.1	46.7	12.9	79.6	46.9	14.9	6
7	24.5	88.3	52.4	17.1	82.2	47.8	14.0	80.7	48.1	16.1	7
8	25.6	89.3	53.5	18.1	83.3	48.9	15.1	81.8	49.2	17.2	8
9	26.7	90.4	54.6	19.2	84.3	50.0	16.2	82.9	50.3	18.3	9
10	1227.7	1291.5	1355.7	1420.3	1485.4	1551.1	1617.3	1684.1	1751.5	1819.5	10
11	28.8	92.5	56.7	21.4	86.5	52.2	18.4	85.2	52.6	20.6	11
12	29.8	93.6	57.8	22.5	87.6	53.3	19.5	86.3	53.7	21.8	12
13	30.9	94.7	58.9	23.5	88.7	54.4	20.6	87.4	54.8	22.9	13
14	32.0	95.7	59.9	24.6	89.8	55.5	21.7	88.5	56.0	24.0	14
15	1233.0	1296.8	1361.0	1425.7	1490.9	1556.6	1622.8	1689.7	1757.1	1825.2	15
16	34.1	97.9	62.1	26.8	92.0	57.7	23.9	90.8	58.2	26.3	16
17	35.1	98.9	63.2	27.9	93.1	58.8	25.0	91.9	59.4	27.5	17
18	36.2	1300.0	64.2	29.0	94.2	59.9	26.2	93.0	60.5	28.6	18
19	37.3	01.1	65.3	30.0	95.2	61.0	27.3	94.1	61.6	29.7	19
20	1238.3	1302.1	1366.4	1431.1	1496.3	1562.1	1628.4	1695.3	1762.7	1830.9	20
21	39.4	03.2	67.5	32.2	97.4	63.2	29.5	96.4	63.9	32.0	21
22	40.4	04.3	68.5	33.3	98.5	64.3	30.6	97.5	65.0	33.2	22
23	41.5	05.3	69.6	34.4	99.6	65.4	31.7	98.6	66.1	34.3	23
24	42.6	06.4	70.7	35.4	1500.7	66.5	32.8	99.7	67.3	35.4	24
25	1243.6	1307.5	1371.8	1436.5	1501.8	1567.6	1633.9	1700.9	1768.4	1836.6	25
26	44.7	08.5	72.8	37.6	02.9	68.7	35.0	02.0	69.5	37.7	26
27	45.7	09.6	73.9	38.7	04.0	69.8	36.1	03.1	70.7	38.9	27
28	46.8	10.7	75.0	39.8	05.1	70.9	37.3	04.2	71.8	40.0	28
29	47.9	11.7	76.1	40.9	06.2	72.0	38.4	05.3	72.9	41.2	29
30	1248.9	1312.8	1377.1	1442.0	1507.3	1573.1	1639.5	1706.5	1774.1	1842.3	30
31	50.0	13.9	78.2	43.0	08.4	74.2	40.6	07.6	75.2	43.4	31
32	51.0	14.9	79.3	44.1	09.4	75.3	41.7	08.7	76.3	44.6	32
33	52.1	16.0	80.4	45.2	10.5	76.4	42.8	09.8	77.4	45.7	33
34	53.2	17.1	81.5	46.3	11.6	77.5	43.9	10.9	78.6	46.9	34
35	1254.2	1318.2	1382.5	1447.4	1512.7	1578.6	1645.0	1712.1	1779.7	1848.0	35
36	55.3	19.2	83.6	48.5	13.8	79.7	46.2	13.2	80.8	49.2	36
37	56.4	20.3	84.7	49.5	14.9	80.8	47.3	14.3	82.0	50.3	37
38	57.4	21.4	85.8	50.6	16.0	81.9	48.4	15.4	83.1	51.4	38
39	58.5	22.4	86.8	51.7	17.1	83.0	49.5	16.6	84.2	52.6	39
40	1259.5	1323.5	1387.9	1452.8	1518.2	1584.1	1650.6	1717.7	1785.4	1853.7	40
41	60.6	24.6	89.0	53.9	19.3	85.2	51.7	18.8	86.5	54.9	41
42	61.7	25.6	90.1	55.0	20.4	86.3	52.8	19.9	87.6	56.0	42
43	62.7	26.7	91.1	56.1	21.5	87.4	53.9	21.1	88.8	57.2	43
44	63.8	27.8	92.2	57.1	22.6	88.5	55.1	22.2	89.9	58.3	44
45	1264.9	1328.9	1393.3	1458.2	1523.7	1589.6	1656.2	1723.3	1791.1	1859.5	45
46	65.9	29.9	94.4	59.3	24.8	90.7	57.3	24.4	92.2	60.6	46
47	67.0	31.0	95.5	60.4	25.9	91.8	58.4	25.5	93.3	61.8	47
48	68.0	32.1	96.5	61.5	27.0	92.9	59.5	26.7	94.5	62.9	48
49	69.1	33.1	97.6	62.6	28.0	94.1	60.6	27.8	95.6	64.0	49
50	1270.2	1334.2	1398.7	1463.7	1529.1	1595.2	1661.7	1728.9	1796.7	1865.2	50
51	71.2	35.3	99.8	64.8	30.2	96.3	62.9	30.0	97.9	66.3	51
52	72.3	36.3	1400.9	65.8	31.3	97.4	64.0	31.2	99.0	67.5	52
53	73.4	37.4	01.9	66.9	32.4	98.5	65.1	32.3	1800.1	68.6	53
54	74.4	38.5	03.0	68.0	33.5	99.6	66.2	33.4	01.3	69.8	54
55	1275.5	1339.6	1404.1	1469.1	1534.6	1600.7	1667.3	1734.5	1802.4	1870.9	55
56	76.6	40.6	05.2	70.2	35.7	01.8	68.4	35.7	03.5	72.1	56
57	77.6	41.7	06.2	71.3	36.8	02.9	69.5	36.8	04.7	73.2	57
58	78.7	42.8	07.3	72.4	37.9	04.0	70.7	37.9	05.8	74.4	58
59	79.7	43.8	08.4	73.5	39.0	05.1	71.8	39.1	07.0	75.5	59
M.	20°	21°	22°	23°	24°	25°	26°	27°	28°	29°	M.

TABLE 3.

Meridional Parts, or Increased Latitudes.

Comp. $\frac{1}{293.465}$

M.	80°	81°	82°	83°	84°	85°	86°	87°	88°	89°	M.
0	1876.7	1946.0	2016.0	2086.8	2158.4	2230.9	2304.2	2378.5	2453.8	2530.2	0
1	77.8	47.1	17.2	88.0	59.6	32.1	05.5	79.8	55.1	31.5	1
2	79.0	48.3	18.3	89.2	60.8	33.3	06.7	81.0	56.4	32.8	2
3	80.1	49.4	19.5	90.3	62.0	34.5	07.9	82.3	57.6	34.0	3
4	81.3	50.6	20.7	91.5	63.2	35.7	09.2	83.5	58.9	35.3	4
5	1882.4	1951.8	2021.9	2092.7	2164.4	2236.9	2310.4	2384.8	2460.2	2536.6	5
6	83.6	52.9	23.0	93.9	65.6	38.2	11.6	86.0	61.4	37.9	6
7	84.7	54.1	24.2	95.1	66.8	39.4	12.9	87.3	62.7	39.2	7
8	85.9	55.3	25.4	96.3	68.0	40.6	14.1	88.5	64.0	40.5	8
9	87.0	56.4	26.6	97.5	69.2	41.8	15.3	89.8	65.2	41.7	9
10	1888.2	1957.6	2027.7	2098.7	2170.4	2243.0	2316.5	2391.0	2466.5	2543.0	10
11	89.3	58.7	28.9	99.8	71.6	44.2	17.8	92.3	67.8	44.3	11
12	90.5	59.9	30.1	2101.0	72.8	45.5	19.0	93.5	69.0	45.6	12
13	91.6	61.1	31.3	02.2	74.0	46.7	20.3	94.8	70.3	46.9	13
14	92.8	62.2	32.4	03.4	75.2	47.9	21.5	96.0	71.6	48.2	14
15	1893.9	1963.4	2033.6	2104.6	2176.4	2249.1	2322.7	2397.3	2472.8	2549.5	15
16	95.1	64.6	34.8	05.8	77.6	50.3	24.0	98.5	74.1	50.7	16
17	96.2	65.7	36.0	07.0	78.8	51.6	25.2	99.8	75.4	52.0	17
18	97.4	66.9	37.1	08.2	80.0	52.8	26.4	2401.0	76.6	53.3	18
19	98.5	68.1	38.3	09.4	81.2	54.0	27.7	02.3	77.9	54.6	19
20	1899.7	1969.2	2039.5	2110.6	2182.5	2255.2	2328.9	2403.5	2479.2	2555.9	20
21	1900.8	70.4	40.7	11.8	83.7	56.4	30.1	04.8	80.4	57.2	21
22	02.0	71.5	41.8	12.9	84.9	57.7	31.4	06.0	81.7	58.5	22
23	03.1	72.7	43.0	14.1	86.1	58.9	32.6	07.3	83.0	59.8	23
24	04.3	73.9	44.2	15.3	87.3	60.1	33.8	08.5	84.3	61.0	24
25	1905.5	1975.0	2045.4	2116.5	2188.5	2261.3	2335.1	2409.8	2485.5	2562.3	25
26	06.6	76.2	46.6	17.7	89.7	62.5	36.3	11.1	86.8	63.6	26
27	07.8	77.4	47.7	18.9	90.9	63.8	37.6	12.3	88.1	64.9	27
28	08.9	78.5	48.9	20.1	92.1	65.0	38.8	13.6	89.3	66.2	28
29	10.1	79.7	50.1	21.3	93.3	66.2	40.0	14.8	90.6	67.5	29
30	1911.2	1980.9	2051.3	2122.5	2194.5	2267.4	2341.3	2416.1	2491.9	2568.8	30
31	12.4	82.0	52.5	23.7	95.7	68.7	42.5	17.3	93.2	70.1	31
32	13.5	83.2	53.6	24.9	96.9	69.9	43.7	18.6	94.4	71.4	32
33	14.7	84.4	54.8	26.1	98.1	71.1	45.0	19.8	95.7	72.7	33
34	15.8	85.5	56.0	27.3	99.4	72.3	46.2	21.1	97.0	73.9	34
35	1917.0	1986.7	2057.2	2128.5	2200.6	2273.5	2347.5	2422.3	2498.3	2575.2	35
36	18.2	87.9	58.4	29.6	01.8	74.8	48.7	23.6	99.5	76.5	36
37	19.3	89.1	59.5	30.8	03.0	76.0	49.9	24.9	2500.8	77.8	37
38	20.5	90.2	60.7	32.0	04.2	77.2	51.2	26.1	02.1	79.1	38
39	21.6	91.4	61.9	33.2	05.4	78.4	52.4	27.4	03.4	80.4	39
40	1922.8	1992.6	2063.1	2134.4	2206.6	2279.7	2353.7	2428.6	2504.6	2581.7	40
41	23.9	93.7	64.3	35.6	07.8	80.9	54.9	29.9	05.9	83.0	41
42	25.1	94.9	65.5	36.8	09.0	82.1	56.1	31.2	07.2	84.3	42
43	26.3	96.1	66.6	38.0	10.2	83.3	57.4	32.4	08.5	85.6	43
44	27.4	97.2	67.8	39.2	11.5	84.6	58.6	33.7	09.7	86.9	44
45	1928.6	1998.4	2069.0	2140.4	2212.7	2285.8	2359.9	2434.9	2511.0	2588.2	45
46	29.7	99.6	70.2	41.6	13.9	87.0	61.1	36.2	12.3	89.5	46
47	30.9	2000.7	71.4	42.8	15.1	88.3	62.4	37.4	13.6	90.8	47
48	32.0	01.9	72.6	44.0	16.3	89.5	63.6	38.7	14.8	92.1	48
49	33.2	03.1	73.7	45.2	17.5	90.7	64.8	40.0	16.1	93.4	49
50	1934.4	2004.3	2074.9	2146.4	2218.7	2291.9	2366.1	2441.2	2517.4	2594.7	50
51	35.5	05.4	76.1	47.6	19.9	93.2	67.3	42.5	18.7	96.0	51
52	36.7	06.6	77.3	48.8	21.1	94.4	68.6	43.7	20.0	97.3	52
53	37.8	07.8	78.5	50.0	22.4	95.6	69.8	45.0	21.2	98.5	53
54	39.0	08.9	79.7	51.2	23.6	96.9	71.1	46.3	22.5	99.8	54
55	1940.2	2010.1	2080.8	2152.4	2224.8	2298.1	2372.3	2447.5	2523.8	2601.1	55
56	41.3	11.3	82.0	53.6	26.0	99.3	73.6	48.8	25.1	02.4	56
57	42.5	12.5	83.2	54.8	27.2	2300.5	74.8	50.1	26.4	03.7	57
58	43.6	13.6	84.4	56.0	28.4	01.8	76.1	51.3	27.6	05.0	58
59	44.8	14.8	85.6	57.2	29.6	03.0	77.3	52.6	28.9	06.3	59
M.	80°	81°	82°	83°	84°	85°	86°	87°	88°	89°	M.

TABLE 3.

Meridional Parts, or Increased Latitudes.

Comp. $\frac{1}{293.465}$

M.	40°	41°	42°	43°	44°	45°	46°	47°	48°	49°	M.
0	2607.6	2686.2	2766.0	2847.1	2929.5	3013.4	3098.7	3185.6	3274.1	3364.4	0
1	08.9	87.6	67.4	48.5	30.9	14.8	3100.1	87.1	75.6	65.9	1
2	10.2	88.9	68.7	49.9	32.3	16.2	01.6	88.5	77.1	67.4	2
3	11.5	90.2	70.1	51.2	33.7	17.6	03.0	90.0	78.6	69.0	3
4	12.8	91.5	71.4	52.6	35.1	19.0	04.4	91.4	80.1	70.5	4
5	2614.1	2692.8	2772.8	2853.9	2936.5	3020.4	3105.9	3192.9	3281.6	3372.0	5
6	15.4	94.2	74.1	55.3	37.9	21.8	07.3	94.4	83.1	73.5	6
7	16.8	95.5	75.4	56.7	39.3	23.3	08.8	95.8	84.6	75.1	7
8	18.1	96.8	76.8	58.0	40.6	24.7	10.2	97.3	86.1	76.6	8
9	19.4	98.1	78.1	59.4	42.0	26.1	11.6	98.8	87.6	78.1	9
10	2620.7	2699.5	2779.5	2860.8	2943.4	3027.5	3113.1	3200.2	3289.0	3379.6	10
11	22.0	2700.8	80.8	62.1	44.8	28.9	14.5	01.7	90.5	81.2	11
12	23.3	02.1	82.2	63.5	46.2	30.3	16.0	03.2	92.0	82.7	12
13	24.6	03.4	83.5	64.9	47.6	31.7	17.4	04.6	93.5	84.2	13
14	25.9	04.8	84.8	66.2	49.0	33.2	18.8	06.1	95.0	85.7	14
15	2627.2	2706.1	2786.2	2867.6	2950.4	3034.6	3120.3	3207.6	3296.5	3387.3	15
16	28.5	07.4	87.5	69.0	51.8	36.0	21.7	09.0	98.0	88.8	16
17	29.8	08.7	88.9	70.3	53.2	37.4	23.2	10.5	99.5	90.3	17
18	31.1	10.1	90.2	71.7	54.5	38.8	24.6	12.0	3301.0	91.8	18
19	32.4	11.4	91.6	73.1	55.9	40.2	26.0	13.4	02.5	93.4	19
20	2633.7	2712.7	2792.9	2874.4	2957.3	3041.7	3127.5	3214.9	3304.0	3394.9	20
21	35.0	14.0	94.3	75.8	58.7	43.1	28.9	16.4	05.5	96.4	21
22	36.3	15.4	95.6	77.2	60.1	44.5	30.4	17.9	07.0	98.0	22
23	37.6	16.7	97.0	78.6	61.5	45.9	31.8	19.3	08.5	99.5	23
24	38.9	18.0	98.3	79.9	62.9	47.3	33.3	20.8	10.0	3401.0	24
25	2640.2	2719.3	2799.7	2881.3	2964.3	3048.7	3134.7	3222.3	3311.5	3402.6	25
26	41.6	20.7	2801.0	82.7	65.7	50.2	36.2	23.7	13.0	04.1	26
27	42.9	22.0	02.4	84.0	67.1	51.6	37.6	25.2	14.5	05.6	27
28	44.2	23.3	03.7	85.4	68.5	53.0	39.0	26.7	16.0	07.2	28
29	45.5	24.7	05.1	86.8	69.9	54.4	40.5	28.2	17.5	08.7	29
30	2646.8	2726.0	2806.4	2888.2	2971.3	3055.9	3141.9	3229.6	3319.0	3410.2	30
31	48.1	27.3	07.8	89.5	72.7	57.3	43.4	31.1	20.5	11.8	31
32	49.4	28.6	09.1	90.9	74.1	58.7	44.8	32.6	22.1	13.3	32
33	50.7	30.0	10.5	92.3	75.5	60.1	46.3	34.1	23.6	14.8	33
34	52.0	31.3	11.8	93.7	76.9	61.5	47.7	35.6	25.1	16.4	34
35	2653.3	2732.6	2813.2	2895.0	2978.3	3063.0	3149.2	3237.0	3326.6	3417.9	35
36	54.7	34.0	14.5	96.4	79.7	64.4	50.6	38.5	28.1	19.5	36
37	56.0	35.3	15.9	97.8	81.1	65.8	52.1	40.0	29.6	21.0	37
38	57.3	36.6	17.2	99.2	82.5	67.2	53.5	41.5	31.1	22.5	38
39	58.6	38.0	18.6	2900.5	83.9	68.7	55.0	42.9	32.6	24.1	39
40	2659.9	2739.3	2820.0	2901.9	2985.3	3070.1	3156.4	3244.4	3334.1	3425.6	40
41	61.2	40.6	21.3	03.3	86.7	71.5	57.9	45.9	35.6	27.2	41
42	62.5	42.0	22.7	04.7	88.1	72.9	59.4	47.4	37.1	28.7	42
43	63.9	43.3	24.0	06.1	89.5	74.4	60.8	48.9	38.6	30.2	43
44	65.2	44.6	25.4	07.4	90.9	75.8	62.3	50.3	40.2	31.8	44
45	2666.5	2746.0	2826.7	2908.8	2992.3	3077.2	3163.7	3251.8	3341.7	3433.3	45
46	67.8	47.3	28.1	10.2	93.7	78.7	65.2	53.3	43.2	34.9	46
47	69.1	48.6	29.4	11.6	95.1	80.1	66.6	54.8	44.7	36.4	47
48	70.4	50.0	30.8	13.0	96.5	81.5	68.1	56.3	46.2	38.0	48
49	71.7	51.3	32.2	14.3	97.9	82.9	69.5	57.8	47.7	39.5	49
50	2673.1	2752.7	2833.5	2915.7	2999.3	3084.4	3171.0	3259.3	3349.2	3441.0	50
51	74.4	54.0	34.9	17.1	3000.7	85.8	72.5	60.7	50.8	42.6	51
52	75.7	55.3	36.2	18.5	02.1	87.2	73.9	62.2	52.3	44.1	52
53	77.0	56.7	37.6	19.9	03.5	88.7	75.4	63.7	53.8	45.7	53
54	78.3	58.0	39.0	21.2	04.9	90.1	76.8	65.2	55.3	47.2	54
55	2679.6	2759.3	2840.3	2922.6	3006.3	3091.5	3178.3	3266.7	3356.8	3448.8	55
56	81.0	60.7	41.7	24.0	07.7	93.0	79.7	68.2	58.3	50.3	56
57	82.3	62.0	43.0	25.4	09.2	94.4	81.2	69.7	59.9	51.9	57
58	83.6	63.4	44.4	26.8	10.6	95.8	82.7	71.1	61.4	53.4	58
59	84.9	64.7	45.8	28.2	12.0	97.3	84.1	72.6	62.9	55.0	59
M.	40°	41°	42°	43°	44°	45°	46°	47°	48°	49°	M.

TABLE 3.

Meridional Parts, or Increased Latitudes.

Comp. $\frac{1}{293.465}$

M.	50°	51°	52°	53°	54°	55°	56°	57°	58°	59°	M.
0	3456.5	3550.6	3646.7	3745.1	3845.7	3948.8	4054.5	4163.0	4274.4	4389.1	0
1	58.1	52.2	48.4	46.7	47.4	50.5	56.3	64.8	76.3	91.0	1
2	59.6	53.8	50.0	48.4	49.1	52.3	58.1	66.6	78.2	92.9	2
3	61.2	55.4	51.6	50.0	50.8	54.0	59.8	68.5	80.1	94.9	3
4	62.7	56.9	53.2	51.7	52.5	55.7	61.6	70.3	82.0	96.8	4
5	3464.3	3558.5	3654.8	3753.4	3854.2	3957.5	4063.4	4172.1	4283.9	4398.8	5
6	65.9	60.1	56.5	55.0	55.9	59.2	65.2	74.0	85.7	4400.7	6
7	67.4	61.7	58.1	56.7	57.6	61.0	67.0	75.8	87.6	02.6	7
8	69.0	63.3	59.7	58.3	59.3	62.7	68.8	77.7	89.5	04.6	8
9	70.5	64.9	61.3	60.0	61.0	64.5	70.6	79.5	91.4	06.5	9
10	3472.1	3566.5	3663.0	3761.7	3862.7	3966.2	4072.4	4181.3	4293.3	4408.5	10
11	73.6	68.1	64.6	63.3	64.4	68.0	74.2	83.2	95.2	10.4	11
12	75.2	69.7	66.2	65.0	66.1	69.7	76.0	85.0	97.1	12.4	12
13	76.7	71.3	67.9	66.7	67.8	71.5	77.7	86.9	99.0	14.3	13
14	78.3	72.8	69.5	68.3	69.5	73.2	79.5	88.7	4300.9	16.3	14
15	3479.9	3574.4	3671.1	3770.0	3871.2	3975.0	4081.3	4190.6	4302.8	4418.2	15
16	81.4	76.0	72.7	71.7	72.9	76.7	83.1	92.4	04.7	20.2	16
17	83.0	77.6	74.4	73.3	74.6	78.5	84.9	94.2	06.6	22.1	17
18	84.5	79.2	76.0	75.0	76.3	80.2	86.7	96.1	08.5	24.1	18
19	86.1	80.8	77.6	76.7	78.1	82.0	88.5	97.9	10.4	26.1	19
20	3487.7	3582.4	3679.3	3778.3	3879.8	3983.7	4090.3	4199.8	4312.3	4428.0	20
21	89.2	84.0	80.9	80.0	81.5	85.5	92.1	4201.6	14.2	30.0	21
22	90.8	85.6	82.5	81.7	83.2	87.2	93.9	03.5	16.1	31.9	22
23	92.4	87.2	84.2	83.3	84.9	89.0	95.7	05.3	18.0	33.9	23
24	93.9	88.8	85.8	85.0	86.6	90.7	97.5	07.2	19.9	35.8	24
25	3495.5	3590.4	3687.4	3786.7	3888.3	3992.5	4099.3	4209.0	4321.8	4437.8	25
26	97.1	92.0	89.1	88.4	90.0	94.3	4101.1	10.9	23.7	39.8	26
27	98.6	93.6	90.7	90.0	91.8	96.0	02.9	12.8	25.6	41.7	27
28	3500.2	95.2	92.3	91.7	93.5	97.8	04.8	14.6	27.5	43.7	28
29	01.8	96.8	94.0	93.4	95.2	99.5	06.6	16.5	29.4	45.7	29
30	3503.3	3598.4	3695.6	3795.1	3896.9	4001.3	4108.4	4218.3	4331.3	4447.6	30
31	04.9	3600.0	97.3	96.8	98.6	03.1	10.2	20.2	33.2	49.6	31
32	06.5	01.6	98.9	98.4	3900.4	04.8	12.0	22.0	35.2	51.6	32
33	08.0	03.2	3700.5	3800.1	02.1	06.6	13.8	23.9	37.1	53.5	33
34	09.6	04.8	02.2	01.8	03.8	08.3	15.6	25.8	39.0	55.5	34
35	3511.2	3606.4	3703.8	3803.5	3905.5	4010.1	4117.4	4227.6	4340.9	4457.5	35
36	12.7	08.0	05.5	05.1	07.2	11.9	19.2	29.5	42.8	59.4	36
37	14.3	09.6	07.1	06.8	09.0	13.6	21.0	31.3	44.7	61.4	37
38	15.9	11.2	08.7	08.5	10.7	15.4	22.9	33.2	46.6	63.4	38
39	17.5	12.8	10.4	10.2	12.4	17.2	24.7	35.1	48.6	65.4	39
40	3519.0	3614.5	3712.0	3811.9	3914.1	4018.9	4126.5	4236.9	4350.5	4467.3	40
41	20.6	16.1	13.7	13.6	15.9	20.7	28.3	38.8	52.4	69.3	41
42	22.2	17.7	15.3	15.2	17.6	22.5	30.1	40.7	54.3	71.3	42
43	23.7	19.3	17.0	17.0	19.3	24.3	31.9	42.5	56.2	73.3	43
44	25.3	20.9	18.6	18.6	21.0	26.0	33.8	44.4	58.2	75.3	44
45	3526.9	3622.5	3720.3	3820.3	3922.8	4027.8	4135.6	4246.3	4360.1	4477.2	45
46	28.5	24.1	21.9	22.0	24.5	29.6	37.4	48.1	62.0	79.2	46
47	30.1	25.7	23.6	23.7	26.2	31.4	39.2	50.0	63.9	81.2	47
48	31.6	27.3	25.2	25.4	28.0	33.1	41.0	51.9	65.9	83.2	48
49	33.2	29.0	26.9	27.1	29.7	34.9	42.9	53.8	67.8	85.2	49
50	3534.8	3630.6	3728.5	3828.7	3931.4	4036.7	4144.7	4255.6	4369.7	4487.2	50
51	36.4	32.2	30.2	30.4	33.2	38.5	46.5	57.5	71.7	89.1	51
52	37.9	33.8	31.8	32.1	34.9	40.2	48.3	59.4	73.6	91.1	52
53	39.5	35.4	33.5	33.8	36.6	42.0	50.2	61.3	75.5	93.1	53
54	41.1	37.0	35.1	35.5	38.4	43.8	52.0	63.1	77.4	95.1	54
55	3542.7	3638.6	3736.8	3837.2	3940.1	4045.6	4153.8	4265.0	4379.4	4497.1	55
56	44.3	40.3	38.4	38.9	41.8	47.4	55.7	66.9	81.3	99.1	56
57	45.9	41.9	40.1	40.6	43.6	49.1	57.5	68.8	83.2	4501.1	57
58	47.4	43.5	41.7	42.3	45.3	50.9	59.3	70.7	85.2	03.1	58
59	49.0	45.1	43.4	45.0	47.0	52.7	61.1	72.5	87.1	05.1	59
M.	50°	51°	52°	53°	54°	55°	56°	57°	58°	59°	M.

TABLE 3.

Meridional Parts, or Increased Latitudes.

Comp. $\frac{1}{293.465}$

M.	60°	61°	62°	63°	64°	65°	66°	67°	68°	69°	M.
0	4507.1	4628.7	4754.3	4884.1	5018.4	5157.6	5302.1	5452.4	5609.1	5772.7	0
1	09.1	30.8	56.4	86.3	20.6	59.9	04.6	55.0	11.8	75.5	1
2	11.1	32.9	58.6	88.5	22.9	62.3	07.0	57.6	14.4	78.3	2
3	13.1	34.9	60.7	90.7	25.2	64.7	09.5	60.1	17.1	81.1	3
4	15.1	37.0	62.8	92.9	27.5	67.0	11.9	62.7	19.8	83.8	4
5	4517.1	4639.0	4764.9	4895.1	5029.8	5169.4	5314.4	5465.2	5622.4	5786.6	5
6	19.1	41.1	67.1	97.3	32.1	71.8	16.9	67.8	25.1	89.4	6
7	21.1	43.2	69.2	99.5	34.3	74.2	19.3	70.4	27.8	92.2	7
8	23.1	45.2	71.3	4901.7	36.6	76.5	21.8	72.9	30.5	95.1	8
9	25.1	47.3	73.5	03.9	38.9	78.9	24.3	75.5	33.2	97.9	9
10	4527.1	4649.4	4775.6	4906.1	5041.2	5181.3	5326.7	5477.1	5635.9	5800.7	10
11	29.1	51.5	77.8	08.3	43.5	83.7	29.2	80.7	38.5	03.5	11
12	31.1	53.5	79.9	10.5	45.8	86.0	31.7	83.2	41.2	06.3	12
13	33.1	55.6	82.0	12.8	48.1	88.4	34.2	85.8	43.9	09.1	13
14	35.1	57.7	84.2	15.0	50.4	90.8	36.6	88.4	46.6	11.9	14
15	4537.1	4659.7	4786.3	4917.2	5052.7	5193.2	5339.1	5491.0	5649.3	5814.7	15
16	39.2	61.8	88.5	19.4	55.0	95.6	41.6	93.6	52.0	17.6	16
17	41.2	63.9	90.6	21.6	57.3	98.0	44.1	96.2	54.7	20.4	17
18	43.2	66.0	92.8	23.9	59.6	5200.4	46.6	98.7	57.4	23.2	18
19	45.2	68.1	94.9	26.1	61.9	02.7	49.1	5501.3	60.1	26.0	19
20	4547.2	4670.1	4797.1	4928.3	5064.2	5205.1	5351.5	5503.9	5662.8	5828.9	20
21	49.2	72.2	99.2	30.5	66.5	07.5	54.0	06.5	65.5	31.7	21
22	51.3	74.3	4801.4	32.8	68.8	09.9	56.5	09.1	68.2	34.5	22
23	53.3	76.4	03.5	35.0	71.1	12.3	59.0	11.7	70.9	37.4	23
24	55.3	78.5	05.7	37.2	73.4	14.7	61.5	14.3	73.7	40.2	24
25	4557.3	4680.6	4807.8	4939.4	5075.7	5217.1	5364.0	5516.9	5676.4	5843.0	25
26	59.3	82.6	10.0	41.7	78.1	19.5	66.5	19.5	79.1	45.9	26
27	61.4	84.7	12.1	43.9	80.4	21.9	69.0	22.1	81.8	48.7	27
28	63.4	86.8	14.3	46.1	82.7	24.3	71.5	24.7	84.5	51.6	28
29	65.4	88.9	16.5	48.4	85.0	26.7	74.0	27.3	87.3	54.4	29
30	4567.4	4691.0	4818.6	4950.6	5087.3	5229.1	5376.5	5529.9	5690.0	5857.3	30
31	69.5	93.1	20.8	52.9	89.6	31.6	79.0	32.5	92.7	60.1	31
32	71.5	95.2	23.0	55.1	92.0	34.0	81.5	35.2	95.4	63.0	32
33	73.5	97.3	25.1	57.3	94.3	36.4	84.0	37.8	98.2	65.9	33
34	75.6	99.4	27.3	59.6	96.6	38.8	86.5	40.4	5700.9	68.7	34
35	4577.6	4701.5	4829.5	4961.8	5098.9	5241.2	5389.1	5543.0	5703.6	5871.6	35
36	79.6	03.6	31.6	64.1	5101.3	43.6	91.6	45.6	06.4	74.4	36
37	81.7	05.7	33.8	66.3	03.6	46.0	94.1	48.3	09.1	77.3	37
38	83.7	07.8	36.0	68.6	05.9	48.5	96.6	50.9	11.9	80.2	38
39	85.7	09.9	38.1	70.8	08.3	50.9	99.1	53.5	14.6	83.1	39
40	4587.8	4712.0	4840.3	4973.1	5110.6	5253.3	5401.6	5556.1	5717.3	5885.9	40
41	89.8	14.1	42.5	75.3	12.9	55.7	04.2	58.8	20.1	88.8	41
42	91.8	16.2	44.7	77.6	15.3	58.2	06.7	61.4	22.8	91.7	42
43	93.9	18.3	46.8	79.8	17.6	60.6	09.2	64.0	25.6	94.6	43
44	95.9	20.4	49.0	82.1	19.9	63.0	11.8	66.7	28.3	97.4	44
45	4598.0	4722.5	4851.2	4984.3	5122.3	5265.4	5414.3	5569.3	5731.1	5900.3	45
46	4600.0	24.6	53.4	86.6	24.6	67.9	16.8	71.9	33.9	03.2	46
47	02.1	26.7	55.6	88.9	27.0	70.3	19.3	74.6	36.6	06.1	47
48	04.1	28.9	57.8	91.1	29.3	72.8	21.9	77.2	39.4	09.0	48
49	06.1	31.0	59.9	93.4	31.7	75.2	24.4	79.9	42.1	11.9	49
50	4608.2	4733.1	4862.1	4995.6	5134.0	5277.6	5427.0	5582.5	5744.9	5914.8	50
51	10.2	35.2	64.3	97.9	36.4	80.1	29.5	85.2	47.7	17.7	51
52	12.3	37.3	66.5	5000.2	38.7	82.5	32.0	87.8	50.4	20.6	52
53	14.3	39.4	68.7	02.4	41.1	85.0	34.6	90.5	53.2	23.5	53
54	16.4	41.6	70.9	04.7	43.4	87.4	37.1	93.1	56.0	26.4	54
55	4618.5	4743.7	4873.1	5007.0	5145.8	5289.8	5439.7	5595.8	5758.8	5929.3	55
56	20.5	45.8	75.3	09.3	48.1	92.3	42.2	98.4	61.5	32.2	56
57	22.6	47.9	77.5	11.5	50.5	94.7	44.8	5601.1	64.3	35.1	57
58	24.6	50.0	79.7	13.8	52.8	97.2	47.3	03.8	67.1	38.1	58
59	26.7	52.2	81.9	16.1	55.2	99.7	49.9	06.4	69.9	41.0	59
M.	60°	61°	62°	63°	64°	65°	66°	67°	68°	69°	M.

TABLE 3.

Meridional Parts, or Increased Latitudes.

Comp. $\frac{1}{293.465}$

M.	70°	71°	72°	73°	74°	75°	76°	77°	78°	79°	M.
0	5943.9	6123.5	6312.5	6512.0	6723.2	6947.7	7187.3	7444.4	7721.6	8022.7	0
1	46.8	26.6	15.8	15.4	26.8	51.6	91.5	48.8	26.4	27.9	1
2	49.7	29.7	19.0	18.9	30.5	55.4	95.6	53.3	31.3	33.2	2
3	52.7	32.8	22.3	22.3	34.1	59.3	99.7	57.7	36.1	38.5	3
4	55.6	35.8	25.5	25.7	37.7	63.2	7203.9	62.2	40.9	43.7	4
5	5958.5	6138.9	6328.8	6529.1	6741.4	6967.1	7208.0	7466.7	7745.8	8049.0	5
6	61.5	42.0	32.0	32.6	45.0	70.9	12.2	71.1	50.6	54.3	6
7	64.4	45.1	35.3	36.0	48.7	74.8	16.4	75.6	55.5	59.6	7
8	67.3	48.2	38.5	39.5	52.3	78.7	20.5	80.1	60.3	64.9	8
9	70.3	51.3	41.8	42.9	56.0	82.6	24.7	84.6	65.2	70.2	9
10	5973.2	6154.4	6345.0	6546.4	6759.7	6986.5	7228.9	7489.1	7770.1	8075.5	10
11	76.2	57.5	48.3	49.8	63.3	90.4	33.1	93.6	74.9	80.8	11
12	79.1	60.6	51.6	53.3	67.0	94.3	37.3	98.1	79.8	86.1	12
13	82.1	63.7	54.8	56.7	70.7	98.3	41.5	7502.6	84.7	91.5	13
14	85.0	66.8	58.1	60.2	74.3	7002.2	45.7	07.1	89.6	96.8	14
15	5988.0	6169.9	6361.4	6563.7	6778.0	7006.1	7249.9	7511.7	7794.5	8102.2	15
16	90.9	73.0	64.7	67.1	81.7	10.0	54.1	16.2	99.4	07.5	16
17	93.9	76.1	67.9	70.6	85.4	14.0	58.3	20.7	7804.3	12.9	17
18	96.9	79.2	71.2	74.1	89.1	17.9	62.5	25.3	09.3	18.3	18
19	99.8	82.3	74.5	77.6	92.8	21.8	66.7	29.8	14.2	23.7	19
20	6002.8	6185.5	6377.8	6581.0	6796.5	7025.8	7270.9	7534.4	7819.1	8129.1	20
21	05.8	88.6	81.1	84.5	6800.2	29.7	75.2	38.9	24.1	34.5	21
22	08.7	91.7	84.4	88.0	03.9	33.7	79.4	43.5	29.0	39.9	22
23	11.7	94.8	87.7	91.5	07.6	37.7	83.7	48.1	34.0	45.3	23
24	14.7	98.0	91.0	95.0	11.3	41.6	87.9	52.7	39.0	50.8	24
25	6017.7	6201.1	6394.3	6598.5	6815.0	7045.6	7292.2	7557.3	7844.0	8156.2	25
26	20.7	04.2	97.6	6602.0	18.8	49.6	96.4	61.8	48.9	61.6	26
27	23.6	07.4	6400.9	05.5	22.5	53.5	7300.7	66.4	53.9	67.1	27
28	26.6	10.5	04.3	09.0	26.2	57.5	05.0	71.0	58.9	72.6	28
29	29.6	13.7	07.6	12.5	30.0	61.5	09.2	75.7	63.9	78.0	29
30	6032.6	6216.8	6410.9	6616.1	6833.7	7065.5	7313.5	7580.3	7868.9	8183.5	30
31	35.6	20.0	14.2	19.6	37.4	69.5	17.8	84.9	74.0	89.0	31
32	38.6	23.1	17.6	23.1	41.2	73.5	22.1	89.5	79.0	94.5	32
33	41.6	26.3	20.9	26.6	44.9	77.5	26.4	94.2	84.0	8200.0	33
34	44.6	29.4	24.2	30.2	48.7	81.5	30.7	98.8	89.1	05.5	34
35	6047.6	6232.6	6427.6	6633.7	6852.4	7085.5	7335.0	7603.4	7894.1	8211.1	35
36	50.6	35.8	30.9	37.2	56.2	89.5	39.3	08.1	99.2	16.6	36
37	53.6	38.9	34.2	40.8	60.0	93.5	43.6	12.8	7904.2	22.1	37
38	56.6	42.1	37.6	44.3	63.7	97.6	47.9	17.4	09.3	27.7	38
39	59.7	45.3	40.9	47.9	67.5	7101.6	52.3	22.1	14.4	33.3	39
40	6062.7	6248.4	6444.3	6651.4	6871.3	7105.6	7356.6	7626.8	7919.4	8238.8	40
41	65.7	51.6	47.6	55.0	75.1	09.7	60.9	31.4	24.5	44.4	41
42	68.7	54.8	51.0	58.5	78.9	13.7	65.3	36.1	29.6	50.0	42
43	71.7	58.0	54.4	62.1	82.6	17.8	69.6	40.8	34.7	55.6	43
44	74.8	61.2	57.7	65.7	86.4	21.8	74.0	45.5	39.9	61.2	44
45	6077.8	6264.4	6461.1	6669.2	6890.2	7125.9	7378.3	7650.2	7945.0	8266.8	45
46	80.8	67.6	64.5	72.8	94.0	29.9	82.7	55.0	50.1	72.4	46
47	83.9	70.8	67.8	76.4	97.8	34.0	87.1	59.7	55.2	78.1	47
48	86.9	74.0	71.2	80.0	6901.7	38.1	91.4	64.4	60.4	83.7	48
49	89.9	77.2	74.6	83.5	05.5	42.2	95.8	69.1	65.5	89.3	49
50	6093.0	6280.4	6478.0	6687.1	6909.3	7146.2	7400.2	7673.9	7970.7	8295.0	50
51	96.0	83.6	81.4	90.7	13.1	50.3	04.6	78.6	75.9	8300.7	51
52	99.1	86.8	84.8	94.3	16.9	54.4	09.0	83.4	81.0	06.4	52
53	6102.1	90.0	88.2	97.9	20.8	58.5	13.4	88.1	86.2	12.0	53
54	05.2	93.2	91.6	6701.5	24.6	62.6	17.8	92.9	91.4	17.7	54
55	6108.2	6296.4	6495.0	6705.1	6928.4	7166.7	7422.2	7697.7	7996.6	8323.4	55
56	11.3	99.6	98.4	08.7	32.3	70.8	26.6	7702.5	8001.8	29.2	56
57	14.3	6302.9	6501.8	12.4	36.1	75.0	31.1	07.2	07.0	34.9	57
58	17.4	06.1	05.2	16.0	40.0	79.1	35.5	12.0	12.2	40.6	58
59	20.5	09.3	08.6	19.6	43.8	83.2	39.9	16.8	17.5	46.4	59
M.	70°	71°	72°	73°	74°	75°	76°	77°	78°	79°	M.

TABLE 4.

Length of a Degree in Latitude and Longitude.

Lat.	Degree of Long.			Degree of Lat.			Lat.
	Naut. miles.	Statute miles.	Meters.	Naut. miles.	Statute miles.	Meters.	
°							°
0	60.068	69.172	111 321	59.661	68.704	110 567	0
1	0.059	9.162	1 304	.661	.704	568	1
2	0.031	9.130	1 253	.662	.705	569	2
3	59.986	9.078	1 169	.663	.706	570	3
4	9.922	9.005	1 051	.664	.708	573	4
5	59.840	68.911	110 900	59.666	68.710	110 576	5
6	9.741	8.795	0 715	.668	.712	580	6
7	9.622	8.660	0 497	.670	.715	584	7
8	9.487	8.504	0 245	.673	.718	589	8
9	9.333	8.326	109 959	.676	.721	595	9
10	59.161	68.129	109 641	59.680	68.725	110 601	10
11	8.971	7.910	9 289	.684	.730	608	11
12	8.764	7.670	8 904	.687	.734	616	12
13	8.538	7.410	8 486	.692	.739	624	13
14	8.295	7.131	8 036	.697	.744	633	14
15	58.034	66.830	107 553	59.702	68.751	110 643	15
16	7.756	6.510	7 036	.707	.757	653	16
17	7.459	6.169	6 487	.713	.764	663	17
18	7.146	5.808	5 906	.719	.771	675	18
19	6.816	5.427	5 294	.725	.778	686	19
20	56.468	65.026	104 649	59.732	68.786	110 699	20
21	6.102	4.606	3 972	.739	.794	712	21
22	5.720	4.166	3 264	.746	.802	725	22
23	5.321	3.706	2 524	.754	.811	739	23
24	4.905	3.228	1 754	.761	.820	753	24
25	54.473	62.729	100 952	59.769	68.829	110 768	25
26	4.024	2.212	0 119	.777	.839	783	26
27	3.558	1.676	99 257	.786	.848	799	27
28	3.076	1.122	8 364	.795	.858	815	28
29	2.578	0.548	7 441	.804	.869	832	29
30	52.064	59.956	96 488	59.813	68.879	110 849	30
31	1.534	9.345	5 506	.822	.890	866	31
32	0.989	8.716	4 495	.831	.901	883	32
33	0.428	8.071	3 455	.841	.912	901	33
34	49.851	7.407	2 387	.851	.923	919	34
35	49.259	56.725	91 290	59.861	68.935	110 938	35
36	8.653	6.027	0 166	.871	.946	956	36
37	8.031	5.311	89 014	.881	.958	975	37
38	7.395	4.579	7 835	.891	.969	994	38
39	6.744	3.829	6 629	.902	.981	111 013	39
40	46.079	53.063	85 396	59.912	68.993	111 033	40
41	5.399	2.281	4 137	.923	69.006	052	41
42	4.706	1.483	2 853	.933	.018	072	42
43	4.000	0.669	1 543	.944	.030	091	43
44	3.280	49.840	0 208	.954	.042	111	44
45	2.546	8.995	78 849	.965	.054	131	45

TABLE 4.

Length of a Degree in Latitude and Longitude.

Lat.	Degree of Long.			Degree of Lat.			Lat.
	Naut. miles.	Statute miles.	Meters.	Naut. miles.	Statute miles.	Meters.	
°							°
45	42.546	48.995	78 849	59.965	69.054	111 131	45
46	1.801	8.136	7 466	.976	.066	151	46
47	1.041	7.261	6 058	.987	.079	170	47
48	0.268	6.372	4 628	.997	.091	190	48
49	39.484	5.469	3 174	60.008	.103	210	49
50	38.688	44.552	71 698	60.019	69.115	111 229	50
51	7.880	3.621	0 200	.029	.127	249	51
52	7.060	2.676	68 680	.039	.139	268	52
53	6.229	1.719	7 140	.050	.151	287	53
54	5.386	0.749	5 578	.060	.163	306	54
55	34.532	39.766	63 996	60.070	69.175	111 325	55
56	3.668	8.771	2 395	.080	.086	343	56
57	2.794	7.764	0 774	.090	.197	362	57
58	1.909	6.745	59 135	.100	.209	380	58
59	1.015	5.716	7 478	.109	.220	397	59
60	30.110	34.674	55 802	60.118	69.230	111 415	60
61	29.197	3.623	4 110	.128	.241	432	61
62	8.275	2.560	2 400	.137	.251	448	62
63	7.344	1.488	0 675	.145	.261	464	63
64	6.404	0.406	48 934	.154	.271	480	64
65	25.456	29.315	47 177	60.162	69.281	111 496	65
66	4.501	8.215	5 407	.170	.290	511	66
67	3.538	7.106	3 622	.178	.299	525	67
68	2.567	5.988	1 823	.186	.308	539	68
69	1.590	4.862	0 012	.193	.316	553	69
70	20.606	23.729	38 188	60.200	69.324	111 566	70
71	19.616	2.589	6 353	.207	.332	578	71
72	8.619	1.441	4 506	.213	.340	590	72
73	7.617	0.287	2 648	.220	.347	602	73
74	6.609	19.127	0 781	.225	.354	613	74
75	15.596	17.960	28 903	60.231	69.360	111 623	75
76	4.578	6.788	7 017	.236	.366	633	76
77	3.556	5.611	5 123	.241	.372	642	77
78	2.529	4.428	3 220	.246	.377	650	78
79	1.499	3.242	1 311	.250	.382	658	79
80	10.465	12.051	19 394	60.254	69.386	111 665	80
81	9.428	10.857	7 472	.257	.390	671	81
82	8.388	9.659	5 545	.260	.394	677	82
83	7.345	8.458	3 612	.263	.397	682	83
84	6.300	7.255	1 675	.265	.400	687	84
85	5.253	6.049	9 735	60.268	69.402	111 691	85
86	4.205	4.842	7 792	.269	.404	694	86
87	3.154	3.632	5 846	.270	.405	696	87
88	2.103	2.422	3 898	.271	.407	698	88
89	1.052	1.211	1 949	.272	.407	699	89
90	0	0	0	.272	.407	699	90

TABLE 5A.

Distance of an Object by Two Bearings.

Difference between the course and second bearing, in points.	Difference between the course and first bearing, in points.													
	2		2¼		2½		2¾		3		3¼		3½	
3	1.96	1.09												
3¼	1.57	0.94	2.19	1.31										
3½	1.32	0.84	1.76	1.12	2.42	1.53								
3¾	1.14	0.76	1.47	0.99	1.94	1.30	2.64	1.77						
4	1.00	0.71	1.27	0.90	1.62	1.15	2.12	1.50	2.85	2.01				
4¼	0.90	0.66	1.12	0.83	1.40	1.04	1.77	1.31	2.29	1.69	3.05	2.26		
4½	0.81	0.63	1.00	0.77	1.23	0.95	1.53	1.18	1.91	1.48	2.45	1.90	3.25	2.51
4¾	0.74	0.60	0.91	0.73	1.10	0.89	1.34	1.08	1.65	1.32	2.05	1.65	2.61	2.10
5	0.69	0.57	0.83	0.69	1.00	0.83	1.20	1.00	1.45	1.21	1.77	1.47	2.19	1.82
5¼	0.64	0.55	0.77	0.66	0.92	0.79	1.09	0.94	1.30	1.11	1.56	1.34	1.88	1.62
5½	0.60	0.53	0.72	0.63	0.85	0.75	1.00	0.88	1.18	1.04	1.39	1.23	1.66	1.46
5¾	0.57	0.52	0.68	0.61	0.79	0.72	0.93	0.84	1.08	0.98	1.26	1.14	1.48	1.34
6	0.54	0.50	0.64	0.59	0.74	0.69	0.86	0.80	1.00	0.92	1.16	1.07	1.35	1.24
6¼	0.52	0.49	0.60	0.57	0.70	0.66	0.81	0.76	0.93	0.88	1.07	1.01	1.23	1.16
6½	0.50	0.47	0.58	0.55	0.67	0.64	0.77	0.73	0.88	0.84	1.00	0.96	1.14	1.09
6¾	0.48	0.46	0.55	0.54	0.64	0.62	0.73	0.71	0.83	0.80	0.94	0.91	1.06	1.03
7	0.46	0.45	0.53	0.52	0.61	0.60	0.69	0.68	0.79	0.77	0.89	0.87	1.00	0.98
7¼	0.45	0.44	0.51	0.51	0.59	0.58	0.67	0.66	0.75	0.74	0.84	0.83	0.94	0.93
7½	0.43	0.43	0.50	0.50	0.57	0.56	0.64	0.64	0.72	0.72	0.80	0.80	0.90	0.89
7¾	0.42	0.42	0.48	0.48	0.55	0.55	0.62	0.62	0.69	0.69	0.77	0.77	0.86	0.86
8	0.41	0.41	0.47	0.47	0.53	0.53	0.60	0.60	0.67	0.67	0.74	0.74	0.82	0.82
8¼	0.41	0.41	0.46	0.46	0.52	0.52	0.58	0.58	0.65	0.65	0.72	0.72	0.79	0.79
8½	0.40	0.40	0.45	0.45	0.51	0.51	0.57	0.57	0.63	0.63	0.69	0.69	0.76	0.76
8¾	0.39	0.39	0.45	0.44	0.50	0.50	0.56	0.55	0.61	0.61	0.68	0.67	0.74	0.73
9	0.39	0.38	0.44	0.43	0.49	0.48	0.55	0.54	0.60	0.59	0.66	0.65	0.72	0.71
9¼	0.39	0.38	0.44	0.42	0.49	0.47	0.54	0.52	0.59	0.57	0.64	0.63	0.70	0.68
9½	0.38	0.37	0.43	0.41	0.48	0.46	0.53	0.51	0.58	0.56	0.63	0.61	0.69	0.66
9¾	0.38	0.36	0.43	0.40	0.48	0.45	0.52	0.49	0.57	0.54	0.62	0.59	0.67	0.63
10	0.38	0.35	0.43	0.40	0.47	0.44	0.52	0.48	0.57	0.52	0.61	0.57	0.66	0.61
10¼	0.38	0.35	0.43	0.39	0.47	0.43	0.52	0.47	0.56	0.51	0.61	0.55	0.65	0.59
10½	0.38	0.34	0.43	0.38	0.47	0.42	0.51	0.45	0.56	0.49	0.60	0.53	0.65	0.57
10¾	0.39	0.33	0.43	0.37	0.47	0.40	0.51	0.44	0.56	0.48	0.60	0.51	0.64	0.55
11	0.39	0.32	0.43	0.36	0.47	0.39	0.51	0.43	0.56	0.46	0.60	0.50	0.64	0.53
11¼	0.39	0.31	0.44	0.35	0.48	0.38	0.52	0.41	0.56	0.45	0.60	0.48	0.64	0.51
11½	0.40	0.31	0.44	0.34	0.48	0.37	0.52	0.40	0.56	0.43	0.60	0.46	0.63	0.49
11¾	0.41	0.30	0.45	0.33	0.49	0.36	0.52	0.39	0.56	0.42	0.60	0.44	0.64	0.47
12	0.41	0.29	0.45	0.32	0.49	0.35	0.53	0.37	0.57	0.40	0.60	0.43	0.64	0.45
12¼	0.42	0.28	0.46	0.31	0.50	0.34	0.54	0.36	0.57	0.38	0.61	0.41	0.64	0.42
12½	0.43	0.28	0.47	0.30	0.51	0.32	0.55	0.35	0.58	0.37	0.61	0.39	0.65	0.41
12¾	0.45	0.27	0.48	0.29	0.52	0.31	0.56	0.33	0.59	0.35	0.62	0.37	0.65	0.39
13	0.46	0.26	0.50	0.28	0.53	0.30	0.57	0.32	0.60	0.33	0.63	0.35	0.66	0.37
13¼	0.48	0.24	0.51	0.26	0.55	0.28	0.58	0.30	0.61	0.32	0.64	0.33	0.67	0.35
13½	0.50	0.23	0.53	0.25	0.57	0.27	0.60	0.28	0.63	0.30	0.66	0.31	0.69	0.32
13¾	0.52	0.22	0.55	0.24	0.59	0.25	0.62	0.26	0.65	0.28	0.68	0.29	0.70	0.30
14	0.54	0.21	0.58	0.22	0.61	0.23	0.64	0.24	0.67	0.26	0.69	0.27	0.72	0.28

TABLE 5A.

Distance of an Object by Two Bearings.

Difference between the course and second bearing, in points.	Difference between the course and first bearing, in points.													
	3¾		4		4¼		4½		4¾		5		5¼	
4¾	3.44	2.76												
5	2.76	2.30	3.62	3.01										
5¼	2.31	1.98	2.91	2.50	3.80	3.26								
5½	1.99	1.76	2.44	2.15	3.05	2.69	3.96	3.49						
5¾	1.75	1.59	2.10	1.90	2.55	2.31	3.18	2.88	4.12	3.72				
6	1.57	1.45	1.85	1.71	2.20	2.03	2.66	2.46	3.31	3.05	4.26	3.94		
6¼	1.42	1.34	1.65	1.56	1.94	1.82	2.29	2.16	2.77	2.61	3.42	3.22	4.40	4.14
6½	1.31	1.25	1.50	1.44	1.73	1.66	2.02	1.93	2.38	2.28	2.86	2.74	3.53	3.38
6¾	1.21	1.17	1.38	1.33	1.57	1.52	1.81	1.75	2.10	2.04	2.47	2.39	2.95	2.87
7	1.13	1.11	1.27	1.25	1.44	1.41	1.64	1.61	1.88	1.84	2.17	2.13	2.55	2.50
7¼	1.06	1.05	1.19	1.17	1.33	1.32	1.50	1.49	1.70	1.69	1.94	1.92	2.24	2.22
7½	1.00	1.00	1.11	1.11	1.24	1.24	1.39	1.38	1.56	1.55	1.76	1.76	2.01	2.00
7¾	0.95	0.95	1.05	1.05	1.17	1.17	1.30	1.30	1.45	1.44	1.62	1.62	1.82	1.82
8	0.91	0.91	1.00	1.00	1.10	1.10	1.22	1.22	1.35	1.35	1.50	1.50	1.67	1.67
8¼	0.87	0.87	0.95	0.95	1.05	1.05	1.15	1.15	1.27	1.26	1.40	1.39	1.54	1.54
8½	0.84	0.83	0.91	0.91	1.00	1.00	1.09	1.09	1.20	1.19	1.31	1.30	1.44	1.43
8¾	0.81	0.80	0.88	0.87	0.96	0.95	1.04	1.03	1.14	1.12	1.24	1.22	1.35	1.34
9	0.78	0.77	0.85	0.83	0.92	0.90	1.00	0.98	1.08	1.06	1.18	1.15	1.28	1.25
9¼	0.76	0.74	0.82	0.80	0.89	0.86	0.96	0.93	1.04	1.01	1.12	1.09	1.21	1.18
9½	0.74	0.71	0.80	0.77	0.86	0.83	0.93	0.89	1.00	0.96	1.08	1.03	1.16	1.11
9¾	0.73	0.68	0.78	0.74	0.84	0.79	0.90	0.85	0.97	0.91	1.04	0.97	1.11	1.04
10	0.71	0.66	0.77	0.71	0.82	0.76	0.88	0.81	0.94	0.87	1.00	0.92	1.07	0.99
10¼	0.70	0.63	0.75	0.68	0.80	0.72	0.86	0.77	0.91	0.82	0.97	0.88	1.03	0.93
10½	0.69	0.61	0.74	0.65	0.79	0.69	0.84	0.74	0.89	0.78	0.94	0.83	1.00	0.88
10¾	0.68	0.59	0.73	0.63	0.77	0.66	0.82	0.70	0.87	0.75	0.92	0.79	0.97	0.83
11	0.68	0.56	0.72	0.60	0.76	0.64	0.81	0.67	0.85	0.71	0.90	0.75	0.95	0.79
11¼	0.67	0.54	0.71	0.57	0.76	0.61	0.80	0.64	0.84	0.67	0.88	0.71	0.93	0.75
11½	0.67	0.52	0.71	0.55	0.75	0.58	0.79	0.61	0.83	0.64	0.87	0.67	0.91	0.70
11¾	0.67	0.50	0.71	0.52	0.74	0.55	0.78	0.58	0.82	0.61	0.86	0.64	0.90	0.66
12	0.67	0.48	0.71	0.50	0.74	0.52	0.78	0.55	0.81	0.57	0.85	0.60	0.88	0.63
12¼	0.67	0.45	0.71	0.48	0.74	0.50	0.77	0.52	0.81	0.54	0.84	0.56	0.87	0.59
12½	0.68	0.43	0.71	0.45	0.74	0.47	0.77	0.49	0.80	0.51	0.84	0.53	0.87	0.55
12¾	0.68	0.41	0.71	0.43	0.74	0.44	0.77	0.46	0.80	0.48	0.83	0.50	0.86	0.51
13	0.69	0.38	0.72	0.40	0.75	0.42	0.78	0.43	0.80	0.45	0.83	0.46	0.86	0.48
13¼	0.70	0.36	0.73	0.37	0.76	0.39	0.78	0.40	0.81	0.41	0.83	0.43	0.86	0.44
13½	0.71	0.34	0.74	0.35	0.76	0.36	0.79	0.37	0.81	0.38	0.84	0.39	0.86	0.41
13¾	0.73	0.31	0.75	0.32	0.77	0.33	0.80	0.34	0.82	0.35	0.84	0.36	0.86	0.37
14	0.74	0.28	0.77	0.29	0.79	0.30	0.81	0.31	0.83	0.32	0.85	0.32	0.87	0.33

	5½		5¾		6		6¼		6½		6¾		7	
6½	4.52	4.33												
6¾	3.63	3.52	4.63	4.49										
7	3.04	2.98	3.72	3.65	4.74	4.64								
7¼	2.62	2.59	3.11	3.08	3.80	3.76	4.83	4.77						
7½	2.30	2.29	2.68	2.67	3.18	3.17	3.87	3.86	4.91	4.88				
7¾	2.06	2.06	2.36	2.36	2.74	2.74	3.24	3.24	3.94	3.93	4.97	4.97		
8	1.87	1.87	2.11	2.11	2.41	2.41	2.79	2.79	3.30	3.30	3.99	3.99	5.03	5.03
8¼	1.72	1.71	1.92	1.92	2.16	2.16	2.46	2.46	2.84	2.84	3.34	3.34	4.04	4.03
8½	1.59	1.58	1.76	1.75	1.96	1.95	2.20	2.19	2.50	2.49	2.88	2.87	3.38	3.36
8¾	1.48	1.46	1.63	1.61	1.80	1.78	2.00	1.98	2.24	2.21	2.53	2.51	2.91	2.88
9	1.39	1.36	1.52	1.49	1.66	1.63	1.83	1.80	2.03	1.99	2.27	2.23	2.56	2.51
9¼	1.31	1.27	1.42	1.38	1.55	1.50	1.69	1.64	1.86	1.81	2.06	2.00	2.29	2.23
9½	1.25	1.19	1.35	1.29	1.46	1.39	1.58	1.51	1.72	1.65	1.89	1.81	2.08	1.99
9¾	1.19	1.12	1.28	1.20	1.38	1.30	1.48	1.40	1.61	1.51	1.75	1.64	1.91	1.80
10	1.14	1.05	1.22	1.13	1.31	1.21	1.40	1.30	1.51	1.39	1.62	1.50	1.77	1.63
10¼	1.10	0.99	1.17	1.06	1.25	1.13	1.33	1.20	1.42	1.29	1.53	1.38	1.65	1.49
10½	1.06	0.94	1.13	0.99	1.20	1.05	1.27	1.12	1.35	1.19	1.44	1.27	1.55	1.36
10¾	1.03	0.88	1.09	0.93	1.15	0.99	1.22	1.04	1.29	1.11	1.37	1.18	1.46	1.25
11	1.00	0.83	1.05	0.88	1.11	0.92	1.17	0.97	1.24	1.03	1.31	1.09	1.39	1.15
11¼	0.98	0.78	1.03	0.82	1.08	0.87	1.13	0.91	1.19	0.96	1.25	1.01	1.32	1.06
11½	0.95	0.73	1.00	0.77	1.05	0.81	1.10	0.85	1.15	0.89	1.21	0.93	1.27	0.98
11¾	0.94	0.69	0.98	0.72	1.02	0.76	1.07	0.79	1.12	0.83	1.17	0.86	1.22	0.90
12	0.92	0.65	0.96	0.68	1.00	0.71	1.04	0.73	1.09	0.77	1.13	0.80	1.18	0.83
12¼	0.91	0.61	0.94	0.63	0.98	0.66	1.02	0.68	1.06	0.71	1.10	0.74	1.14	0.77
12½	0.90	0.57	0.93	0.59	0.97	0.61	1.00	0.63	1.04	0.66	1.07	0.68	1.11	0.71
12¾	0.89	0.53	0.92	0.55	0.95	0.57	0.98	0.59	1.02	0.61	1.05	0.63	1.08	0.65
13	0.89	0.49	0.91	0.51	0.94	0.52	0.97	0.54	1.00	0.56	1.03	0.57	1.06	0.59
13¼	0.88	0.45	0.91	0.47	0.93	0.48	0.96	0.49	0.99	0.51	1.01	0.52	1.04	0.54
13½	0.88	0.42	0.91	0.43	0.93	0.44	0.95	0.45	0.98	0.46	1.00	0.47	1.02	0.48
13¾	0.88	0.38	0.90	0.39	0.92	0.40	0.95	0.41	0.97	0.41	0.99	0.42	1.01	0.43
14	0.89	0.34	0.91	0.35	0.92	0.35	0.94	0.36	0.90	0.37	0.98	0.38	1.00	0.38

TABLE 5A.

Distance of an Object by Two Bearings.

Difference between the course and second bearing, in points.	Difference between the course and first bearing, in points.															
	7¼		7½		7¾		8		8¼		8½		8¾		9	
8¼	5.07	5.06														
8½	4.07	4.05	5.10	5.08												
8¾	3.41	3.37	4.10	4.06	5.12	5.06										
9	2.94	2.88	3.43	3.36	4.11	4.03	5.13	5.03								
9¼	2.58	2.51	2.95	2.87	3.44	3.34	4.12	3.39	5.12	4.97						
9½	2.31	2.21	2.60	2.49	2.96	2.84	3.44	3.30	4.11	3.93	5.10	4.88				
9¾	2.10	1.98	2.33	2.19	2.61	2.46	2.97	2.79	3.44	3.24	4.10	3.86	5.07	4.77		
10	1.92	1.78	2.11	1.95	2.34	2.16	2.61	2.41	2.96	2.74	3.43	3.17	4.07	3.76	5.03	4.64
10¼	1.78	1.61	1.93	1.75	2.12	1.92	2.34	2.11	2.61	2.36	2.95	2.67	3.41	3.08	4.04	3.65
10½	1.66	1.46	1.79	1.58	1.94	1.71	2.12	1.87	2.34	2.06	2.60	2.29	2.94	2.59	3.38	2.98
10¾	1.56	1.34	1.67	1.43	1.80	1.54	1.95	1.67	2.12	1.82	2.33	2.00	2.58	2.22	2.91	2.50
11	1.47	1.22	1.57	1.30	1.68	1.39	1.80	1.50	1.94	1.62	2.11	1.76	2.31	1.92	2.56	2.13
11¼	1.40	1.12	1.48	1.19	1.57	1.26	1.68	1.35	1.80	1.44	1.93	1.55	2.10	1.69	2.29	1.84
11½	1.34	1.03	1.41	1.09	1.49	1.15	1.58	1.22	1.68	1.30	1.79	1.38	1.92	1.49	2.08	1.61
11¾	1.28	0.95	1.34	1.00	1.41	1.05	1.49	1.10	1.57	1.17	1.67	1.24	1.78	1.32	1.91	1.41
12	1.23	0.87	1.29	0.91	1.35	0.95	1.41	1.00	1.49	1.05	1.57	1.11	1.66	1.17	1.77	1.25
12¼	1.19	0.80	1.24	0.83	1.29	0.87	1.35	0.91	1.41	0.95	1.48	1.00	1.56	1.05	1.65	1.11
12½	1.15	0.73	1.20	0.76	1.24	0.79	1.29	0.82	1.35	0.86	1.41	0.89	1.47	0.93	1.55	0.98
12¾	1.12	0.67	1.16	0.69	1.20	0.72	1.25	0.74	1.29	0.77	1.34	0.80	1.40	0.83	1.46	0.87
13	1.09	0.61	1.13	0.63	1.16	0.65	1.20	0.67	1.24	0.69	1.29	0.72	1.34	0.74	1.39	0.77
13¼	1.07	0.55	1.10	0.57	1.13	0.58	1.17	0.60	1.20	0.62	1.24	0.64	1.28	0.66	1.32	0.68
13½	1.05	0.50	1.08	0.51	1.10	0.52	1.13	0.53	1.16	0.55	1.20	0.56	1.23	0.58	1.27	0.60
13¾	1.03	0.44	1.06	0.45	1.08	0.46	1.11	0.47	1.13	0.48	1.16	0.50	1.19	0.51	1.22	0.52
14	1.02	0.39	1.04	0.40	1.06	0.41	1.08	0.41	1.10	0.42	1.13	0.43	1.15	0.44	1.18	0.45

	9¼		9½		9¾		10		10¼		10½		10¾		11	
10¼	4.97	4.50														
10½	3.99	3.52	4.91	4.33												
10¾	3.34	2.87	3.94	3.38	4.83	4.14										
11	2.88	2.39	3.30	2.74	3.87	3.22	4.74	3.94								
11¼	2.53	2.04	2.84	2.28	3.24	2.61	3.80	3.05	4.63	3.72						
11½	2.27	1.75	2.50	1.93	2.79	2.16	3.18	2.46	3.72	2.88	4.52	3.49				
11¾	2.06	1.52	2.24	1.66	2.46	1.82	2.74	2.03	3.11	2.31	3.63	2.69	4.40	3.20		
12	1.89	1.33	2.03	1.44	2.20	1.56	2.41	1.71	2.68	1.90	3.04	2.15	3.53	2.50	4.26	3.01
12¼	1.75	1.18	1.86	1.25	2.00	1.34	2.16	1.45	2.36	1.59	2.62	1.76	2.95	1.98	3.42	2.30
12½	1.62	1.03	1.72	1.09	1.83	1.16	1.96	1.24	2.11	1.34	2.30	1.46	2.55	1.62	2.86	1.82
12¾	1.53	0.91	1.61	0.96	1.69	1.01	1.80	1.07	1.92	1.14	2.06	1.23	2.24	1.34	2.47	1.47
13	1.44	0.80	1.51	0.84	1.58	0.88	1.66	0.92	1.76	0.98	1.87	1.04	2.01	1.11	2.17	1.21
13¼	1.37	0.71	1.42	0.73	1.48	0.76	1.55	0.80	1.63	0.84	1.72	0.88	1.82	0.94	1.94	1.00
13½	1.31	0.62	1.35	0.64	1.40	0.66	1.46	0.69	1.52	0.72	1.59	0.75	1.67	0.79	1.76	0.83
13¾	1.25	0.54	1.29	0.55	1.33	0.57	1.38	0.59	1.42	0.61	1.48	0.63	1.54	0.66	1.62	0.69
14	1.21	0.46	1.24	0.47	1.27	0.49	1.31	0.50	1.35	0.52	1.39	0.53	1.44	0.55	1.50	0.57

	11¼		11½		11¾		12		12¼		12½		12¾		13	
12¼	4.12	2.77														
12½	3.31	2.10	3.96	2.51												
12¾	2.77	1.65	3.18	1.90	3.80	2.26										
13	2.38	1.32	2.66	1.48	3.05	1.69	3.62	2.01								
13¼	2.10	1.08	2.29	1.18	2.55	1.31	2.91	1.50	3.44	1.77						
13½	1.88	0.89	2.02	0.95	2.20	1.04	2.44	1.15	2.76	1.30	3.25	1.53				
13¾	1.70	0.73	1.81	0.77	1.94	0.83	2.10	0.90	2.31	0.99	2.61	1.12	3.05	1.31		
14	1.56	0.60	1.64	0.63	1.73	0.66	1.85	0.71	1.99	0.76	2.19	0.84	2.45	0.94	2.85	1.09

TABLE 5B.

Distance of an Object by Two Bearings.

Difference between the course and second bearing.	Difference between the course and first bearing.													
	20°		22°		24°		26°		28°		30°		32°	
30°	1.97	0.98												
32	1.64	0.87	2.16	1.14										
34	1.41	0.79	1.80	1.01	2.34	1.31								
36	1.24	0.73	1.55	0.91	1.96	1.15	2.52	1.48						
38	1.11	0.68	1.36	0.84	1.68	1.04	2.11	1.30	2.70	1.66				
40	1.00	0.64	1.21	0.78	1.48	0.95	1.81	1.16	2.26	1.45	2.88	1.85		
42	0.91	0.61	1.10	0.73	1.32	0.88	1.59	1.06	1.94	1.30	2.40	1.61	3.05	2.04
44	0.84	0.58	1.00	0.69	1.19	0.83	1.42	0.98	1.70	1.18	2.07	1.44	2.55	1.77
46	0.78	0.56	0.92	0.66	1.09	0.78	1.28	0.92	1.52	1.09	1.81	1.30	2.19	1.58
48	0.73	0.54	0.85	0.64	1.00	0.74	1.17	0.87	1.37	1.02	1.62	1.20	1.92	1.43
50	0.68	0.52	0.80	0.61	0.93	0.71	1.08	0.83	1.25	0.96	1.46	1.12	1.71	1.31
52	0.65	0.51	0.75	0.59	0.87	0.68	1.00	0.79	1.15	0.91	1.33	1.05	1.55	1.22
54	0.61	0.49	0.71	0.57	0.81	0.66	0.93	0.76	1.07	0.87	1.23	0.99	1.41	1.14
56	0.58	0.48	0.67	0.56	0.77	0.64	0.88	0.73	1.00	0.83	1.14	0.95	1.30	1.08
58	0.56	0.47	0.64	0.54	0.73	0.62	0.83	0.70	0.94	0.80	1.07	0.90	1.21	1.03
60	0.53	0.46	0.61	0.53	0.69	0.60	0.78	0.68	0.89	0.77	1.00	0.87	1.13	0.98
62	0.51	0.45	0.58	0.51	0.66	0.58	0.75	0.66	0.84	0.74	0.94	0.83	1.06	0.94
64	0.49	0.44	0.56	0.50	0.63	0.57	0.71	0.64	0.80	0.72	0.89	0.80	1.00	0.90
66	0.48	0.43	0.54	0.49	0.61	0.56	0.68	0.62	0.76	0.70	0.85	0.78	0.95	0.87
68	0.46	0.43	0.52	0.48	0.59	0.54	0.66	0.61	0.73	0.68	0.81	0.75	0.90	0.84
70	0.45	0.42	0.50	0.47	0.57	0.53	0.63	0.59	0.70	0.66	0.78	0.73	0.86	0.81
72	0.43	0.41	0.49	0.47	0.55	0.52	0.61	0.58	0.68	0.64	0.75	0.71	0.82	0.78
74	0.42	0.41	0.48	0.46	0.53	0.51	0.59	0.57	0.65	0.63	0.72	0.69	0.79	0.76
76	0.41	0.40	0.46	0.45	0.52	0.50	0.57	0.56	0.63	0.61	0.70	0.67	0.76	0.74
78	0.40	0.39	0.45	0.44	0.50	0.49	0.56	0.54	0.61	0.60	0.67	0.66	0.74	0.72
80	0.39	0.39	0.44	0.44	0.49	0.48	0.54	0.53	0.60	0.59	0.65	0.64	0.71	0.70
82	0.39	0.38	0.43	0.43	0.48	0.47	0.53	0.52	0.58	0.57	0.63	0.63	0.69	0.69
84	0.38	0.38	0.42	0.42	0.47	0.47	0.52	0.51	0.57	0.56	0.62	0.61	0.67	0.67
86	0.37	0.37	0.42	0.42	0.46	0.46	0.51	0.51	0.55	0.55	0.60	0.60	0.66	0.65
88	0.37	0.37	0.41	0.41	0.45	0.45	0.50	0.50	0.54	0.54	0.59	0.59	0.64	0.64
90	0.36	0.36	0.40	0.40	0.45	0.45	0.49	0.49	0.53	0.53	0.58	0.58	0.62	0.62
92	0.36	0.36	0.40	0.40	0.44	0.44	0.48	0.48	0.52	0.52	0.57	0.57	0.61	0.61
94	0.36	0.35	0.39	0.39	0.43	0.43	0.47	0.47	0.51	0.51	0.56	0.55	0.60	0.60
96	0.35	0.35	0.39	0.39	0.43	0.43	0.47	0.46	0.51	0.50	0.55	0.54	0.59	0.59
98	0.35	0.35	0.39	0.38	0.42	0.42	0.46	0.46	0.50	0.50	0.54	0.53	0.58	0.57
100	0.35	0.34	0.38	0.38	0.42	0.41	0.46	0.45	0.49	0.49	0.53	0.52	0.57	0.56
102	0.35	0.34	0.38	0.37	0.42	0.41	0.45	0.44	0.49	0.48	0.53	0.51	0.56	0.55
104	0.34	0.33	0.38	0.37	0.41	0.40	0.45	0.43	0.48	0.47	0.52	0.50	0.56	0.54
106	0.34	0.33	0.38	0.36	0.41	0.39	0.45	0.43	0.48	0.46	0.52	0.50	0.55	0.53
108	0.34	0.32	0.38	0.36	0.41	0.39	0.44	0.42	0.48	0.45	0.51	0.49	0.55	0.52
110	0.34	0.32	0.37	0.35	0.41	0.38	0.44	0.41	0.47	0.44	0.51	0.48	0.54	0.51
112	0.34	0.32	0.37	0.35	0.41	0.38	0.44	0.41	0.47	0.44	0.50	0.47	0.54	0.50
114	0.34	0.31	0.37	0.34	0.41	0.37	0.44	0.40	0.47	0.43	0.50	0.46	0.54	0.49
116	0.34	0.31	0.38	0.34	0.41	0.37	0.44	0.39	0.47	0.42	0.50	0.45	0.53	0.48
118	0.35	0.31	0.38	0.33	0.41	0.36	0.44	0.39	0.47	0.41	0.50	0.44	0.53	0.47
120	0.35	0.30	0.38	0.33	0.41	0.36	0.44	0.38	0.47	0.41	0.50	0.43	0.53	0.46
122	0.35	0.30	0.38	0.32	0.41	0.35	0.44	0.37	0.47	0.40	0.50	0.42	0.53	0.45
124	0.35	0.29	0.38	0.32	0.41	0.34	0.44	0.37	0.47	0.39	0.50	0.42	0.53	0.44
126	0.36	0.29	0.39	0.31	0.42	0.34	0.45	0.36	0.47	0.38	0.50	0.41	0.53	0.43
128	0.36	0.28	0.39	0.31	0.42	0.33	0.45	0.35	0.48	0.38	0.50	0.40	0.53	0.42
130	0.36	0.28	0.39	0.30	0.42	0.32	0.45	0.35	0.48	0.37	0.51	0.39	0.54	0.41
132	0.37	0.27	0.40	0.30	0.43	0.32	0.46	0.34	0.48	0.36	0.51	0.38	0.54	0.40
134	0.37	0.27	0.40	0.29	0.43	0.31	0.46	0.33	0.49	0.35	0.52	0.37	0.54	0.39
136	0.38	0.26	0.41	0.28	0.44	0.30	0.47	0.32	0.49	0.34	0.52	0.36	0.55	0.38
138	0.39	0.26	0.42	0.28	0.45	0.30	0.47	0.32	0.50	0.33	0.53	0.35	0.55	0.37
140	0.39	0.25	0.42	0.27	0.45	0.29	0.48	0.31	0.51	0.33	0.53	0.34	0.56	0.36
142	0.40	0.25	0.43	0.27	0.46	0.28	0.49	0.30	0.51	0.32	0.54	0.33	0.56	0.35
144	0.41	0.24	0.44	0.26	0.47	0.28	0.50	0.29	0.52	0.31	0.55	0.32	0.57	0.34
146	0.42	0.24	0.45	0.25	0.48	0.27	0.51	0.28	0.53	0.30	0.56	0.31	0.58	0.32
148	0.43	0.23	0.46	0.25	0.49	0.26	0.52	0.27	0.54	0.29	0.57	0.30	0.59	0.31
150	0.45	0.22	0.48	0.24	0.50	0.25	0.53	0.26	0.55	0.28	0.58	0.29	0.60	0.30
152	0.46	0.22	0.49	0.23	0.52	0.24	0.54	0.25	0.57	0.27	0.59	0.28	0.61	0.29
154	0.48	0.21	0.50	0.22	0.53	0.23	0.56	0.24	0.58	0.25	0.60	0.26	0.62	0.27
156	0.49	0.20	0.52	0.21	0.55	0.22	0.57	0.23	0.60	0.24	0.62	0.25	0.64	0.26
158	0.51	0.19	0.54	0.20	0.57	0.21	0.59	0.22	0.61	0.23	0.63	0.24	0.66	0.25
160	0.53	0.18	0.56	0.19	0.59	0.20	0.61	0.21	0.63	0.22	0.65	0.22	0.67	0.23

TABLE 5B.

Distance of an Object by Two Bearings.

Difference between the course and second bearing.	Difference between the course and first bearing.													
	34°		36°		38°		40°		42°		44°		46°	
44°	3.22	2.24												
46	2.69	1.93	3.39	2.43										
48	2.31	1.72	2.83	2.10	3.55	2.63								
50	2.03	1.55	2.43	1.86	2.96	2.27	3.70	2.84						
52	1.81	1.43	2.13	1.68	2.54	2.01	3.09	2.44	3.85	3.04				
54	1.63	1.32	1.90	1.54	2.23	1.81	2.66	2.15	3.22	2.60	4.00	3.24		
56	1.49	1.24	1.72	1.42	1.99	1.65	2.33	1.93	2.77	2.29	3.34	2.77	4.14	3.43
58	1.37	1.17	1.57	1.33	1.80	1.53	2.08	1.76	2.43	2.06	2.87	2.44	3.46	2.93
60	1.28	1.10	1.45	1.25	1.64	1.42	1.88	1.63	2.17	1.88	2.52	2.18	2.97	2.57
62	1.19	1.05	1.34	1.18	1.51	1.34	1.72	1.52	1.96	1.73	2.25	1.98	2.61	2.30
64	1.12	1.04	1.25	1.13	1.40	1.26	1.58	1.42	1.79	1.61	2.03	1.83	2.33	2.09
66	1.06	0.96	1.18	1.07	1.31	1.20	1.47	1.34	1.65	1.51	1.85	1.69	2.10	1.92
68	1.00	0.93	1.11	1.03	1.23	1.14	1.37	1.27	1.53	1.42	1.71	1.58	1.92	1.78
70	0.95	0.89	1.05	0.99	1.16	1.09	1.29	1.21	1.43	1.34	1.58	1.49	1.77	1.66
72	0.91	0.86	1.00	0.95	1.10	1.05	1.21	1.15	1.34	1.27	1.48	1.41	1.64	1.56
74	0.87	0.84	0.95	0.92	1.05	1.01	1.15	1.10	1.26	1.21	1.39	1.34	1.53	1.47
76	0.84	0.81	0.91	0.89	1.00	0.97	1.09	1.06	1.20	1.16	1.31	1.27	1.44	1.40
78	0.80	0.79	0.88	0.86	0.96	0.94	1.04	1.02	1.14	1.11	1.24	1.22	1.36	1.33
80	0.78	0.77	0.85	0.83	0.92	0.91	1.00	0.98	1.09	1.07	1.18	1.16	1.28	1.27
82	0.75	0.75	0.82	0.81	0.89	0.88	0.96	0.95	1.04	1.03	1.13	1.12	1.22	1.21
84	0.73	0.73	0.79	0.79	0.86	0.85	0.93	0.92	1.00	0.99	1.08	1.07	1.17	1.16
86	0.71	0.71	0.77	0.77	0.83	0.83	0.89	0.89	0.96	0.96	1.04	1.04	1.12	1.12
88	0.69	0.69	0.75	0.75	0.80	0.80	0.86	0.86	0.93	0.93	1.00	1.00	1.08	1.07
90	0.67	0.67	0.73	0.73	0.78	0.78	0.84	0.84	0.90	0.90	0.97	0.97	1.04	1.04
92	0.66	0.66	0.71	0.71	0.76	0.76	0.82	0.82	0.87	0.87	0.93	0.93	1.00	1.00
94	0.65	0.64	0.69	0.69	0.74	0.74	0.79	0.79	0.85	0.85	0.91	0.90	0.97	0.97
96	0.63	0.63	0.68	0.67	0.73	0.72	0.78	0.77	0.83	0.82	0.88	0.88	0.94	0.93
98	0.62	0.62	0.67	0.66	0.71	0.70	0.76	0.75	0.81	0.80	0.86	0.85	0.91	0.90
100	0.61	0.60	0.65	0.64	0.70	0.69	0.74	0.73	0.79	0.78	0.84	0.83	0.89	0.88
102	0.60	0.59	0.64	0.63	0.68	0.67	0.73	0.71	0.77	0.76	0.82	0.80	0.87	0.85
104	0.60	0.58	0.63	0.61	0.67	0.65	0.72	0.69	0.76	0.74	0.80	0.78	0.85	0.82
106	0.59	0.57	0.63	0.60	0.66	0.64	0.70	0.68	0.74	0.72	0.79	0.76	0.83	0.80
108	0.58	0.55	0.62	0.59	0.66	0.62	0.69	0.66	0.73	0.70	0.77	0.74	0.81	0.77
110	0.58	0.54	0.61	0.57	0.65	0.61	0.68	0.64	0.72	0.68	0.76	0.71	0.80	0.75
112	0.57	0.53	0.61	0.56	0.64	0.59	0.68	0.63	0.71	0.66	0.75	0.69	0.79	0.73
114	0.57	0.52	0.60	0.55	0.63	0.58	0.67	0.61	0.70	0.64	0.74	0.68	0.78	0.71
116	0.56	0.51	0.60	0.54	0.63	0.57	0.66	0.60	0.70	0.63	0.73	0.66	0.77	0.69
118	0.56	0.50	0.59	0.52	0.63	0.55	0.66	0.58	0.69	0.61	0.72	0.64	0.76	0.67
120	0.56	0.49	0.59	0.51	0.62	0.54	0.65	0.57	0.68	0.59	0.72	0.62	0.75	0.65
122	0.56	0.47	0.59	0.50	0.62	0.53	0.65	0.55	0.68	0.58	0.71	0.60	0.74	0.63
124	0.56	0.46	0.59	0.49	0.62	0.51	0.65	0.54	0.68	0.56	0.71	0.58	0.74	0.61
126	0.56	0.45	0.59	0.48	0.62	0.50	0.64	0.52	0.67	0.54	0.70	0.57	0.73	0.59
128	0.56	0.44	0.59	0.46	0.62	0.49	0.64	0.51	0.67	0.53	0.70	0.55	0.73	0.57
130	0.56	0.43	0.59	0.45	0.62	0.47	0.64	0.49	0.67	0.51	0.70	0.53	0.72	0.55
132	0.56	0.42	0.59	0.44	0.62	0.46	0.64	0.48	0.67	0.50	0.70	0.52	0.72	0.54
134	0.57	0.41	0.59	0.43	0.62	0.45	0.64	0.46	0.67	0.48	0.69	0.50	0.72	0.52
136	0.57	0.40	0.60	0.41	0.62	0.43	0.65	0.45	0.67	0.47	0.70	0.48	0.72	0.50
138	0.58	0.39	0.60	0.40	0.63	0.42	0.65	0.43	0.67	0.45	0.70	0.47	0.72	0.48
140	0.58	0.37	0.61	0.39	0.63	0.40	0.65	0.42	0.68	0.43	0.70	0.45	0.72	0.46
142	0.59	0.36	0.61	0.38	0.63	0.39	0.66	0.41	0.68	0.42	0.70	0.43	0.72	0.45
144	0.60	0.35	0.62	0.36	0.64	0.38	0.66	0.39	0.68	0.40	0.71	0.41	0.73	0.43
146	0.60	0.34	0.63	0.35	0.65	0.36	0.67	0.37	0.69	0.39	0.71	0.40	0.73	0.41
148	0.61	0.32	0.63	0.34	0.66	0.35	0.68	0.36	0.70	0.37	0.72	0.38	0.74	0.39
150	0.62	0.31	0.64	0.32	0.66	0.33	0.68	0.34	0.70	0.35	0.72	0.36	0.74	0.37
152	0.63	0.30	0.65	0.31	0.67	0.32	0.69	0.33	0.71	0.33	0.73	0.34	0.75	0.35
154	0.65	0.28	0.67	0.29	0.68	0.30	0.70	0.31	0.72	0.32	0.74	0.32	0.76	0.33
156	0.66	0.27	0.68	0.28	0.70	0.28	0.72	0.29	0.73	0.30	0.75	0.30	0.77	0.31
158	0.67	0.25	0.69	0.26	0.71	0.27	0.73	0.27	0.74	0.28	0.76	0.28	0.78	0.29
160	0.69	0.24	0.71	0.24	0.73	0.25	0.74	0.25	0.76	0.26	0.77	0.26	0.79	0.27

TABLE 5B.

Distance of an Object by Two Bearings.

Difference between the course and second bearing.	Difference between the course and first bearing.													
	48°		50°		52°		54°		56°		58°		60°	
58°	4.28	3.63												
60	3.57	3.10	4.41	3.82										
62	3.07	2.71	3.68	3.25	4.54	4.01								
64	2.70	2.42	3.17	2.85	3.79	3.41	4.66	4.19						
66	2.40	2.20	2.78	2.54	3.26	2.98	3.89	3.55	4.77	4.36				
68	2.17	2.01	2.48	2.30	2.86	2.65	3.34	3.10	3.99	3.71	4.88	4.53		
70	1.98	1.86	2.24	2.10	2.55	2.39	2.94	2.76	3.43	3.22	4.08	3.83	4.99	4.69
72	1.83	1.74	2.04	1.94	2.30	2.19	2.62	2.49	3.01	2.86	3.51	3.33	4.17	3.96
74	1.70	1.63	1.88	1.81	2.10	2.02	2.37	2.27	2.68	2.58	3.08	2.96	3.58	3.44
76	1.58	1.54	1.75	1.70	1.94	1.88	2.16	2.10	2.42	2.35	2.74	2.66	3.14	3.05
78	1.49	1.45	1.63	1.60	1.80	1.76	1.99	1.95	2.21	2.16	2.48	2.43	2.80	2.74
80	1.40	1.38	1.53	1.51	1.68	1.65	1.85	1.82	2.04	2.01	2.26	2.23	2.53	2.49
82	1.33	1.32	1.45	1.43	1.58	1.56	1.72	1.71	1.89	1.87	2.08	2.06	2.31	2.29
84	1.26	1.26	1.37	1.36	1.49	1.48	1.62	1.61	1.77	1.76	1.93	1.92	2.13	2.12
86	1.21	1.20	1.30	1.30	1.41	1.41	1.53	1.52	1.66	1.65	1.81	1.80	1.98	1.97
88	1.16	1.16	1.24	1.24	1.34	1.34	1.45	1.45	1.56	1.56	1.70	1.70	1.84	1.84
90	1.11	1.11	1.19	1.19	1.28	1.28	1.38	1.38	1.48	1.48	1.60	1.60	1.73	1.73
92	1.07	1.07	1.14	1.14	1.23	1.23	1.31	1.31	1.41	1.41	1.52	1.52	1.63	1.63
94	1.03	1.03	1.10	1.10	1.18	1.17	1.26	1.26	1.35	1.34	1.44	1.44	1.55	1.54
96	1.00	0.99	1.06	1.06	1.13	1.13	1.21	1.20	1.29	1.28	1.38	1.37	1.47	1.47
98	0.97	0.96	1.03	1.02	1.10	1.08	1.16	1.15	1.24	1.23	1.32	1.31	1.41	1.39
100	0.94	0.93	1.00	0.98	1.06	1.04	1.12	1.11	1.19	1.18	1.27	1.25	1.35	1.33
102	0.92	0.90	0.97	0.95	1.03	1.01	1.09	1.06	1.15	1.13	1.22	1.19	1.29	1.27
104	0.90	0.87	0.95	0.92	1.00	0.97	1.06	1.02	1.12	1.08	1.18	1.14	1.25	1.21
106	0.88	0.84	0.92	0.89	0.97	0.94	1.03	0.99	1.09	1.04	1.14	1.10	1.20	1.16
108	0.86	0.82	0.90	0.86	0.95	0.90	1.00	0.95	1.05	1.00	1.11	1.05	1.17	1.11
110	0.84	0.79	0.88	0.83	0.93	0.87	0.98	0.92	1.02	0.96	1.08	1.01	1.13	1.06
112	0.83	0.77	0.87	0.80	0.91	0.84	0.95	0.88	1.00	0.93	1.05	0.97	1.10	1.02
114	0.81	0.74	0.85	0.78	0.89	0.82	0.93	0.85	0.98	0.89	1.02	0.93	1.07	0.98
116	0.80	0.72	0.84	0.75	0.88	0.79	0.92	0.82	0.96	0.85	1.00	0.90	1.04	0.94
118	0.79	0.70	0.83	0.73	0.86	0.76	0.90	0.79	0.94	0.83	0.98	0.86	1.02	0.90
120	0.78	0.68	0.82	0.71	0.85	0.74	0.89	0.77	0.91	0.80	0.96	0.83	1.00	0.87
122	0.77	0.66	0.81	0.68	0.84	0.71	0.87	0.74	0.90	0.77	0.95	0.80	0.98	0.83
124	0.77	0.63	0.80	0.66	0.83	0.69	0.86	0.71	0.90	0.74	0.93	0.77	0.96	0.80
126	0.76	0.61	0.79	0.64	0.82	0.66	0.85	0.69	0.88	0.71	0.91	0.74	0.95	0.77
128	0.75	0.59	0.78	0.62	0.81	0.64	0.84	0.66	0.87	0.69	0.90	0.71	0.93	0.74
130	0.75	0.57	0.78	0.60	0.81	0.62	0.83	0.64	0.86	0.66	0.89	0.68	0.92	0.71
132	0.75	0.56	0.77	0.57	0.80	0.59	0.83	0.61	0.85	0.64	0.88	0.66	0.91	0.68
134	0.74	0.54	0.77	0.55	0.80	0.57	0.82	0.59	0.85	0.61	0.87	0.63	0.90	0.65
136	0.74	0.52	0.77	0.53	0.80	0.55	0.82	0.57	0.84	0.58	0.87	0.60	0.89	0.62
138	0.74	0.50	0.77	0.51	0.79	0.53	0.81	0.54	0.84	0.56	0.86	0.58	0.89	0.59
140	0.74	0.48	0.77	0.49	0.79	0.51	0.81	0.52	0.83	0.54	0.86	0.55	0.88	0.57
142	0.74	0.46	0.77	0.47	0.79	0.49	0.81	0.50	0.83	0.51	0.85	0.52	0.87	0.54
144	0.75	0.44	0.77	0.45	0.79	0.46	0.81	0.48	0.83	0.49	0.85	0.50	0.87	0.51
146	0.75	0.42	0.77	0.43	0.79	0.44	0.81	0.45	0.83	0.46	0.85	0.47	0.87	0.49
148	0.76	0.40	0.77	0.41	0.79	0.42	0.81	0.43	0.83	0.44	0.85	0.45	0.87	0.46
150	0.76	0.38	0.78	0.39	0.80	0.40	0.81	0.41	0.83	0.42	0.85	0.42	0.87	0.43
152	0.77	0.36	0.78	0.37	0.80	0.38	0.82	0.38	0.83	0.39	0.85	0.40	0.87	0.41
154	0.77	0.34	0.79	0.35	0.81	0.35	0.82	0.36	0.84	0.37	0.85	0.37	0.87	0.38
156	0.78	0.32	0.80	0.32	0.81	0.33	0.83	0.34	0.84	0.34	0.86	0.35	0.87	0.35
158	0.79	0.30	0.81	0.30	0.82	0.31	0.83	0.31	0.85	0.32	0.86	0.32	0.87	0.33
160	0.80	0.27	0.82	0.28	0.83	0.28	0.84	0.29	0.85	0.29	0.86	0.30	0.88	0.30

TABLE 5B.

Distance of an Object by Two Bearings.

Difference between the course and second bearing.	Difference between the course and first bearing.															
	62°		64°		66°		68°		70°		72°		74°		76°	
72°	5.08	4.84														
74	4.25	4.08	5.18	4.98												
76	3.65	3.54	4.32	4.19	5.26	5.10										
78	3.20	3.13	3.72	3.63	4.39	4.30	5.34	5.22								
80	2.86	2.81	3.26	3.21	3.78	3.72	4.46	4.39	5.41	5.33						
82	2.58	2.56	2.91	2.88	3.31	3.28	3.83	3.80	4.52	4.48	5.48	5.42				
84	2.36	2.34	2.63	2.61	2.96	2.94	3.36	3.35	3.88	3.86	4.57	4.55	5.54	5.51		
86	2.17	2.17	2.40	2.39	2.67	2.66	3.00	2.99	3.41	3.40	3.93	3.92	4.62	4.61	5.59	5.57
88	2.01	2.01	2.21	2.21	2.44	2.44	2.71	2.71	3.04	3.04	3.45	3.45	3.97	3.97	4.67	4.66
90	1.88	1.88	2.05	2.05	2.25	2.25	2.48	2.48	2.75	2.75	3.08	3.08	3.49	3.49	4.01	4.01
92	1.77	1.76	1.91	1.91	2.08	2.08	2.28	2.28	2.51	2.51	2.78	2.78	3.11	3.11	3.52	3.52
94	1.67	1.66	1.80	1.79	1.95	1.94	2.12	2.11	2.31	2.30	2.54	2.53	2.81	2.80	3.14	3.13
96	1.58	1.57	1.70	1.69	1.83	1.82	1.97	1.96	2.14	2.13	2.34	2.33	2.57	2.55	2.84	2.82
98	1.50	1.49	1.61	1.59	1.72	1.71	1.85	1.84	2.00	1.98	2.17	2.15	2.36	2.34	2.59	2.56
100	1.43	1.41	1.53	1.51	1.63	1.61	1.75	1.72	1.88	1.85	2.03	2.00	2.19	2.16	2.39	2.35
102	1.37	1.34	1.46	1.43	1.55	1.52	1.66	1.62	1.77	1.73	1.90	1.86	2.05	2.00	2.21	2.16
104	1.32	1.28	1.40	1.36	1.48	1.44	1.58	1.53	1.68	1.63	1.79	1.74	1.92	1.87	2.07	2.01
106	1.27	1.22	1.34	1.29	1.42	1.37	1.51	1.45	1.60	1.54	1.70	1.63	1.81	1.74	1.94	1.87
108	1.23	1.17	1.29	1.23	1.37	1.30	1.44	1.37	1.53	1.45	1.62	1.54	1.72	1.63	1.83	1.74
110	1.19	1.12	1.25	1.17	1.32	1.24	1.39	1.30	1.46	1.37	1.54	1.45	1.64	1.54	1.74	1.63
112	1.15	1.07	1.21	1.12	1.27	1.18	1.33	1.24	1.40	1.30	1.48	1.37	1.56	1.45	1.65	1.53
114	1.12	1.02	1.17	1.07	1.23	1.12	1.29	1.18	1.35	1.24	1.42	1.30	1.50	1.37	1.58	1.44
116	1.09	0.98	1.14	1.03	1.19	1.07	1.25	1.12	1.31	1.17	1.37	1.23	1.44	1.29	1.51	1.36
118	1.07	0.94	1.11	0.98	1.16	1.02	1.21	1.07	1.26	1.12	1.32	1.17	1.38	1.22	1.45	1.28
120	1.04	0.90	1.08	0.94	1.13	0.98	1.18	1.02	1.23	1.06	1.28	1.11	1.34	1.16	1.40	1.21
122	1.02	0.86	1.06	0.90	1.10	0.93	1.15	0.97	1.19	1.01	1.24	1.05	1.29	1.10	1.35	1.14
124	1.00	0.83	1.04	0.86	1.08	0.89	1.12	0.93	1.16	0.96	1.21	1.00	1.25	1.04	1.31	1.08
126	0.98	0.79	1.02	0.82	1.05	0.85	1.09	0.88	1.13	0.92	1.18	0.95	1.22	0.99	1.27	1.02
128	0.97	0.76	1.00	0.79	1.03	0.82	1.07	0.84	1.11	0.87	1.15	0.90	1.19	0.94	1.23	0.97
130	0.95	0.73	0.98	0.75	1.02	0.78	1.05	0.80	1.09	0.83	1.12	0.86	1.16	0.89	1.20	0.92
132	0.94	0.70	0.97	0.72	1.00	0.74	1.03	0.77	1.06	0.79	1.10	0.82	1.13	0.84	1.17	0.87
134	0.93	0.67	0.96	0.69	0.99	0.71	1.01	0.73	1.04	0.75	1.08	0.77	1.11	0.80	1.14	0.82
136	0.92	0.64	0.95	0.66	0.97	0.68	1.00	0.69	1.03	0.71	1.06	0.74	1.09	0.76	1.12	0.78
138	0.91	0.61	0.94	0.63	0.96	0.64	0.99	0.66	1.01	0.68	1.04	0.70	1.07	0.72	1.10	0.74
140	0.90	0.58	0.93	0.60	0.95	0.61	0.97	0.63	1.00	0.64	1.03	0.66	1.05	0.68	1.08	0.70
142	0.90	0.55	0.92	0.57	0.94	0.58	0.96	0.59	0.99	0.61	1.01	0.62	1.04	0.64	1.06	0.65
144	0.89	0.52	0.91	0.54	0.93	0.55	0.96	0.56	0.98	0.57	1.00	0.59	1.02	0.60	1.05	0.62
146	0.89	0.50	0.91	0.51	0.93	0.52	0.95	0.53	0.97	0.54	0.99	0.55	1.01	0.57	1.03	0.58
148	0.89	0.47	0.90	0.48	0.92	0.49	0.94	0.50	0.96	0.51	0.98	0.52	1.00	0.53	1.02	0.54
150	0.88	0.44	0.90	0.45	0.92	0.46	0.94	0.47	0.95	0.48	0.97	0.49	0.99	0.50	1.01	0.50
152	0.88	0.41	0.90	0.42	0.92	0.43	0.93	0.44	0.95	0.45	0.97	0.45	0.98	0.46	1.00	0.47
154	0.88	0.39	0.90	0.39	0.91	0.40	0.93	0.41	0.94	0.41	0.96	0.42	0.98	0.43	0.99	0.43
156	0.89	0.36	0.90	0.37	0.91	0.37	0.93	0.38	0.94	0.38	0.96	0.39	0.97	0.39	0.99	0.40
158	0.89	0.33	0.90	0.34	0.91	0.34	0.93	0.35	0.94	0.35	0.95	0.36	0.97	0.36	0.98	0.37
160	0.89	0.30	0.90	0.31	0.91	0.31	0.93	0.32	0.94	0.32	0.95	0.33	0.96	0.33	0.98	0.33

TABLE 5B.

Distance of an Object by Two Bearings.

Difference between the course and second bearing.	Difference between the course and first bearing.															
	78°		80°		82°		84°		86°		88°		90°		92°	
88°	5.63	5.63														
90	4.70	4.70	5.67	5.67												
92	4.04	4.04	4.74	4.73	5.70	5.70										
94	3.55	3.54	4.07	4.06	4.76	4.75	5.73	5.71								
96	3.17	3.15	3.57	3.55	4.09	4.07	4.78	4.76	5.74	5.71						
98	2.86	2.83	3.19	3.16	3.69	3.56	4.11	4.07	4.80	4.75	5.76	5.70				
100	2.61	2.57	2.88	2.84	3.20	3.16	3.61	3.55	4.12	4.06	4.81	4.73	5.76	5.67		
102	2.40	2.35	2.63	2.57	2.90	2.83	3.22	3.15	3.62	3.54	4.13	4.04	4.81	4.70	5.76	5.63
104	2.23	2.16	2.42	2.35	2.64	2.56	2.91	2.82	3.23	3.13	3.63	3.52	4.13	4.01	4.81	4.66
106	2.08	2.00	2.25	2.16	2.43	2.34	2.65	2.55	2.92	2.80	3.23	3.11	3.63	3.49	4.13	3.97
108	1.96	1.86	2.10	2.00	2.26	2.15	2.45	2.33	2.66	2.53	2.92	2.78	3.24	3.08	3.63	3.45
110	1.85	1.73	1.97	1.85	2.11	1.98	2.27	2.13	2.45	2.31	2.67	2.51	2.92	2.75	3.23	3.04
112	1.75	1.62	1.86	1.72	1.98	1.83	2.12	1.96	2.28	2.11	2.46	2.28	2.67	2.48	2.92	2.71
114	1.66	1.52	1.76	1.61	1.87	1.71	1.99	1.82	2.12	1.94	2.28	2.08	2.46	2.25	2.67	2.44
116	1.59	1.43	1.68	1.51	1.77	1.59	1.88	1.69	2.00	1.79	2.13	1.91	2.28	2.05	2.46	2.21
118	1.52	1.34	1.60	1.41	1.68	1.49	1.78	1.57	1.88	1.66	2.00	1.76	2.13	1.88	2.28	2.01
120	1.46	1.27	1.53	1.33	1.61	1.39	1.69	1.47	1.78	1.54	1.89	1.63	2.00	1.73	2.13	1.84
122	1.41	1.19	1.47	1.25	1.54	1.31	1.62	1.37	1.70	1.44	1.79	1.52	1.89	1.60	2.00	1.70
124	1.36	1.13	1.42	1.18	1.48	1.23	1.55	1.28	1.62	1.34	1.70	1.41	1.79	1.48	1.89	1.56
126	1.32	1.06	1.37	1.11	1.43	1.15	1.48	1.20	1.55	1.26	1.62	1.31	1.70	1.38	1.79	1.45
128	1.28	1.01	1.33	1.04	1.38	1.08	1.43	1.13	1.49	1.17	1.55	1.23	1.62	1.28	1.70	1.34
130	1.24	0.95	1.29	0.98	1.33	1.02	1.38	1.06	1.44	1.10	1.49	1.14	1.56	1.19	1.62	1.24
132	1.21	0.90	1.25	0.93	1.29	0.96	1.34	0.99	1.39	1.03	1.44	1.07	1.49	1.11	1.55	1.16
134	1.18	0.85	1.22	0.88	1.26	0.90	1.30	0.93	1.34	0.97	1.39	1.00	1.44	1.04	1.49	1.07
136	1.15	0.80	1.19	0.83	1.22	0.85	1.26	0.88	1.30	0.90	1.34	0.93	1.39	0.97	1.44	1.00
138	1.13	0.76	1.16	0.78	1.19	0.80	1.23	0.82	1.27	0.85	1.30	0.87	1.35	0.90	1.39	0.93
140	1.11	0.71	1.14	0.73	1.17	0.75	1.20	0.77	1.23	0.79	1.27	0.82	1.31	0.84	1.34	0.86
142	1.09	0.67	1.12	0.69	1.14	0.70	1.17	0.72	1.20	0.74	1.24	0.76	1.27	0.78	1.30	0.80
144	1.07	0.63	1.10	0.64	1.12	0.66	1.15	0.67	1.18	0.69	1.21	0.71	1.24	0.73	1.27	0.75
146	1.05	0.59	1.08	0.60	1.10	0.62	1.13	0.63	1.15	0.64	1.18	0.66	1.21	0.67	1.24	0.69
148	1.04	0.55	1.06	0.56	1.08	0.57	1.11	0.59	1.13	0.60	1.15	0.61	1.18	0.62	1.21	0.64
150	1.03	0.51	1.05	0.52	1.07	0.53	1.09	0.54	1.11	0.55	1.13	0.57	1.15	0.58	1.18	0.59
152	1.02	0.48	1.04	0.49	1.05	0.49	1.07	0.50	1.09	0.51	1.11	0.52	1.13	0.53	1.15	0.54
154	1.01	0.44	1.02	0.45	1.04	0.46	1.06	0.46	1.08	0.47	1.09	0.48	1.11	0.49	1.13	0.50
156	1.00	0.41	1.01	0.41	1.03	0.42	1.05	0.43	1.06	0.43	1.08	0.44	1.09	0.45	1.11	0.45
158	0.99	0.37	1.01	0.38	1.02	0.38	1.03	0.39	1.05	0.39	1.06	0.40	1.08	0.40	1.09	0.41
160	0.99	0.34	1.00	0.34	1.01	0.35	1.02	0.35	1.04	0.35	1.05	0.36	1.06	0.36	1.08	0.37

	94°		96°		98°		100°		102°		104°		106°		108°	
104°	5.74	5.57														
106	4.80	4.61	5.78	5.51												
108	4.12	3.92	4.78	4.55	5.70	5.42										
110	3.62	3.40	4.11	3.86	4.76	4.48	5.67	5.33								
112	3.23	2.99	3.61	3.35	4.09	3.80	4.74	4.40	5.63	5.22						
114	2.92	2.66	3.22	2.94	3.59	3.28	4.07	3.72	4.70	4.30	5.59	5.10				
116	2.66	2.39	2.91	2.61	3.20	2.88	3.57	3.21	4.04	3.63	4.67	4.19	5.54	4.98		
118	2.45	2.17	2.65	2.34	2.90	2.56	3.19	2.81	3.55	3.13	4.01	3.54	4.62	4.08	5.48	4.84
120	2.28	1.97	2.45	2.12	2.64	2.29	2.88	2.49	3.17	2.74	3.52	3.05	3.97	3.44	4.57	3.96
122	2.12	1.80	2.27	1.92	2.43	2.06	2.63	2.23	2.86	2.43	3.14	2.66	3.49	2.96	3.93	3.33
124	2.00	1.65	2.12	1.76	2.26	1.87	2.42	2.01	2.61	2.16	2.84	2.35	3.11	2.58	3.45	2.86
126	1.88	1.52	1.99	1.61	2.11	1.71	2.25	1.82	2.40	1.95	2.59	2.10	2.81	2.27	3.08	2.49
128	1.78	1.41	1.88	1.48	1.98	1.56	2.10	1.65	2.23	1.76	2.39	1.88	2.57	2.02	2.78	2.19
130	1.70	1.30	1.78	1.36	1.87	1.43	1.97	1.51	2.08	1.60	2.21	1.70	2.36	1.81	2.54	1.94
132	1.62	1.20	1.69	1.26	1.77	1.32	1.86	1.38	1.96	1.45	2.07	1.54	2.19	1.63	2.34	1.74
134	1.55	1.12	1.62	1.16	1.68	1.21	1.76	1.27	1.85	1.33	1.94	1.40	2.05	1.47	2.17	1.56
136	1.49	1.04	1.55	1.07	1.61	1.12	1.68	1.16	1.75	1.22	1.83	1.27	1.92	1.34	2.03	1.41
138	1.44	0.96	1.49	0.99	1.54	1.03	1.60	1.07	1.66	1.11	1.74	1.16	1.81	1.21	1.90	1.27
140	1.39	0.89	1.43	0.92	1.48	0.95	1.53	0.98	1.59	1.02	1.65	1.06	1.72	1.10	1.79	1.15
142	1.34	0.83	1.38	0.85	1.43	0.88	1.47	0.91	1.52	0.94	1.58	0.97	1.64	1.01	1.70	1.05
144	1.30	0.77	1.34	0.79	1.38	0.81	1.42	0.83	1.46	0.86	1.51	0.89	1.56	0.92	1.62	0.95
146	1.27	0.71	1.30	0.73	1.33	0.75	1.37	0.77	1.41	0.79	1.45	0.81	1.50	0.84	1.54	0.86
148	1.23	0.65	1.26	0.67	1.29	0.69	1.33	0.70	1.36	0.72	1.40	0.74	1.44	0.76	1.48	0.78
150	1.20	0.60	1.23	0.61	1.26	0.63	1.29	0.64	1.32	0.66	1.35	0.67	1.38	0.69	1.42	0.71
152	1.18	0.55	1.20	0.56	1.22	0.57	1.25	0.59	1.28	0.60	1.31	0.61	1.34	0.63	1.37	0.64
154	1.15	0.50	1.17	0.51	1.19	0.52	1.22	0.53	1.24	0.54	1.27	0.56	1.29	0.57	1.32	0.58
156	1.13	0.46	1.15	0.47	1.17	0.47	1.19	0.48	1.21	0.49	1.23	0.50	1.25	0.51	1.28	0.52
158	1.11	0.42	1.13	0.42	1.14	0.43	1.16	0.44	1.18	0.44	1.20	0.45	1.22	0.46	1.24	0.47
160	1.09	0.37	1.11	0.38	1.12	0.38	1.14	0.39	1.15	0.39	1.17	0.40	1.19	0.41	1.21	0.41

TABLE 5B.

Distance of an Object by Two Bearings.

Difference between the course and second bearing.	Difference between the course and first bearing.													
	110°		112°		114°		116°		118°		120°		122°	
120°	5.41	4.69												
122	4.52	3.83	5.34	4.53										
124	3.88	3.22	4.46	3.70	5.26	4.36								
126	3.41	2.76	3.83	3.10	4.39	3.55	5.18	4.19						
128	3.04	2.40	3.36	2.65	3.78	2.98	4.32	3.41	5.08	4.01				
130	2.75	2.10	3.00	2.30	3.31	2.54	3.72	2.85	4.25	3.25	4.99	3.82		
132	2.51	1.86	2.71	2.01	2.96	2.20	3.26	2.42	3.65	2.71	4.17	3.10	4.88	3.63
134	2.31	1.66	2.48	1.78	2.67	1.92	2.91	2.09	3.20	2.30	3.58	2.57	4.08	2.93
136	2.14	1.49	2.28	1.58	2.44	1.69	2.63	1.83	2.86	1.98	3.14	2.18	3.51	2.44
138	2.00	1.34	2.12	1.42	2.25	1.50	2.40	1.61	2.58	1.73	2.80	1.88	3.08	2.06
140	1.88	1.21	1.97	1.27	2.08	1.34	2.21	1.42	2.36	1.52	2.53	1.63	2.74	1.76
142	1.77	1.09	1.85	1.14	1.95	1.20	2.05	1.26	2.17	1.34	2.31	1.42	2.48	1.53
144	1.68	0.99	1.75	1.03	1.83	1.07	1.91	1.13	2.01	1.18	2.13	1.25	2.26	1.33
146	1.60	0.89	1.66	0.93	1.72	0.96	1.80	1.01	1.88	1.05	1.98	1.10	2.08	1.17
148	1.53	0.81	1.58	0.84	1.63	0.87	1.70	0.90	1.77	0.94	1.84	0.98	1.93	1.03
150	1.46	0.73	1.51	0.75	1.55	0.78	1.61	0.80	1.67	0.83	1.73	0.87	1.81	0.90
152	1.40	0.66	1.44	0.68	1.48	0.70	1.53	0.72	1.58	0.74	1.63	0.77	1.70	0.80
154	1.35	0.59	1.39	0.61	1.42	0.62	1.46	0.64	1.50	0.66	1.55	0.68	1.60	0.70
156	1.31	0.53	1.33	0.54	1.37	0.56	1.40	0.57	1.43	0.58	1.47	0.60	1.52	0.62
158	1.26	0.47	1.29	0.48	1.32	0.49	1.34	0.50	1.37	0.51	1.41	0.53	1.44	0.54
160	1.23	0.42	1.25	0.43	1.27	0.43	1.29	0.44	1.32	0.45	1.35	0.46	1.38	0.47
	124°		126°		128°		130°		132°		134°		136°	
134°	4.77	3.43												
136	3.99	2.77	4.66	3.23										
138	3.43	2.29	3.89	2.60	4.54	3.04								
140	3.01	1.93	3.34	2.15	3.79	2.44	4.41	2.84						
142	2.68	1.65	2.94	1.81	3.26	2.01	3.66	2.27	4.28	2.63				
144	2.42	1.42	2.62	1.54	2.86	1.68	3.17	1.86	3.57	2.10	4.14	2.43		
146	2.21	1.24	2.37	1.32	2.55	1.43	2.78	1.55	3.07	1.72	3.46	1.93	4.00	2.24
148	2.04	1.08	2.16	1.14	2.30	1.22	2.48	1.31	2.70	1.43	2.97	1.58	3.34	1.77
150	1.89	0.95	1.99	0.99	2.10	1.05	2.24	1.12	2.40	1.20	2.61	1.30	2.87	1.44
152	1.77	0.83	1.85	0.87	1.94	0.91	2.04	0.96	2.17	1.02	2.33	1.09	2.52	1.18
154	1.66	0.73	1.72	0.76	1.80	0.79	1.88	0.83	1.98	0.87	2.10	0.92	2.25	0.99
156	1.56	0.64	1.62	0.66	1.68	0.68	1.75	0.71	1.83	0.74	1.92	0.78	2.03	0.83
158	1.48	0.56	1.53	0.57	1.58	0.59	1.63	0.61	1.70	0.64	1.77	0.66	1.85	0.69
160	1.41	0.48	1.45	0.49	1.49	0.51	1.53	0.52	1.58	0.54	1.64	0.56	1.71	0.58
	138°		140°		142°		144°		146°		148°		150°	
148°	3.85	2.04												
150	3.22	1.61	3.70	1.85										
152	2.77	1.30	3.09	1.45	3.55	1.66								
154	2.43	1.06	2.66	1.16	2.96	1.30	3.38	1.48						
156	2.17	0.88	2.33	0.95	2.54	1.04	2.83	1.15	3.22	1.31				
158	1.96	0.73	2.08	0.78	2.23	0.84	2.43	0.91	2.69	1.01	3.05	1.14		
160	1.79	0.61	1.88	0.64	1.99	0.68	2.13	0.73	2.31	0.79	2.55	0.87	2.88	0.98

TABLE 6.

Distance of Visibility of Objects at Sea.

Height, feet.	Nautical miles.	Statute miles.	Height, feet.	Nautical miles.	Statute miles.	Height, feet.	Nautical miles.	Statute miles.
1	1.1	1.3	100	11.5	13.2	760	31.6	36.4
2	1.7	1.9	105	11.7	13.5	780	32.0	36.9
3	2.0	2.3	110	12.0	13.8	800	32.4	37.3
4	2.3	2.6	115	12.3	14.1	820	32.8	37.8
5	2.5	2.9	120	12.6	14.5	840	33.2	38.3
6	2.8	3.2	125	12.9	14.8	860	33.6	38.7
7	2.9	3.5	130	13.1	15.1	880	34.0	39.2
8	3.1	3.7	135	13.3	15.3	900	34.4	39.6
9	3.5	4.0	140	13.6	15.6	920	34.7	40.0
10	3.6	4.2	145	13.8	15.9	940	35.2	40.5
11	3.8	4.4	150	14.1	16.2	960	35.5	40.9
12	4.0	4.6	160	14.5	16.7	980	35.9	41.3
13	4.2	4.8	170	14.9	17.2	1,000	36.2	41.7
14	4.3	4.9	180	15.4	17.7	1,100	38.0	43.8
15	4.4	5.1	190	15.8	18.2	1,200	39.6	45.6
16	4.6	5.3	200	16.2	18.7	1,300	41.3	47.6
17	4.7	5.4	210	16.6	19.1	1,400	42.9	49.4
18	4.9	5.6	220	17.0	19.6	1,500	44.4	51.1
19	5.0	5.8	230	17.4	20.0	1,600	45.8	52.8
20	5.1	5.9	240	17.7	20.4	1,700	47.2	54.4
21	5.3	6.1	250	18.2	20.9	1,800	48.6	56.0
22	5.4	6.2	260	18.5	21.3	1,900	49.9	57.5
23	5.5	6.3	270	18.9	21.7	2,000	51.2	59.0
24	5.6	6.5	280	19.2	22.1	2,100	52.5	60.5
25	5.7	6.6	290	19.6	22.5	2,200	53.8	61.9
26	5.8	6.7	300	19.9	22.9	2,300	55.0	63.3
27	6.0	6.9	310	20.1	23.2	2,400	56.2	64.7
28	6.1	7.0	320	20.5	23.6	2,500	57.3	66.0
29	6.2	7.1	330	20.8	24.0	2,600	58.5	67.3
30	6.3	7.2	340	21.1	24.3	2,700	59.6	68.6
31	6.4	7.3	350	21.5	24.7	2,800	60.6	69.8
32	6.5	7.5	360	21.7	25.0	2,900	61.8	71.1
33	6.6	7.6	370	22.1	25.4	3,000	62.8	72.3
34	6.7	7.7	380	22.3	25.7	3,100	63.8	73.5
35	6.8	7.8	390	22.7	26.1	3,200	64.9	74.7
36	6.9	7.9	400	22.9	26.4	3,300	65.9	75.9
37	6.9	8.0	410	23.2	26.7	3,400	66.9	77.0
38	7.0	8.1	420	23.5	27.1	3,500	67.8	78.1
39	7.1	8.2	430	23.8	27.4	3,600	68.8	79.2
40	7.2	8.3	440	24.1	27.7	3,700	69.7	80.3
41	7.3	8.4	450	24.3	28.0	3,800	70.7	81.4
42	7.4	8.5	460	24.6	28.3	3,900	71.6	82.4
43	7.5	8.7	470	24.8	28.6	4,000	72.5	83.5
44	7.6	8.8	480	25.1	28.9	4,100	73.4	84.5
45	7.7	8.9	490	25.4	29.2	4,200	74.3	85.6
46	7.8	9.0	500	25.6	29.5	4,300	75.2	86.6
47	7.9	9.0	520	26.1	30.1	4,400	76.1	87.6
48	7.9	9.1	540	26.7	30.7	4,500	76.9	88.5
49	8.0	9.2	560	27.1	31.2	4,600	77.7	89.5
50	8.1	9.3	580	27.6	31.8	4,700	78.6	90.5
55	8.5	9.8	600	28.0	32.3	4,800	79.4	91.4
60	8.9	10.2	620	28.6	32.9	4,900	80.2	92.4
65	9.2	10.6	640	29.0	33.4	5,000	81.0	93.3
70	9.6	11.0	660	29.4	33.9	6,000	88.8	102.2
75	9.9	11.4	680	29.9	34.4	7,000	96.0	110.5
80	10.3	11.8	700	30.3	34.9	8,000	102.6	118.1
85	10.6	12.2	720	30.7	35.4	9,000	108.7	125.2
90	10.9	12.5	740	31.1	35.9	10,000	114.6	132.0
95	11.2	12.9						

TABLE 7.

For converting Arc into Time, and the reverse.

°	H. M.	°	H. M.	°	H. M.	°	H. M.	°	H. M.	°	H. M.
′	M. S.	′	M. S.	′	M. S.	′	M. S.	′	M. S.	′	M. S.
″	S. $\frac{1}{60}$	″	S. $\frac{1}{60}$	″	S. $\frac{1}{60}$	″	S. $\frac{1}{60}$	″	S. $\frac{1}{60}$	″	S. $\frac{1}{60}$
1	0 4	61	4 4	121	8 4	181	12 4	241	16 4	301	20 4
2	0 8	62	4 8	122	8 8	182	12 8	242	16 8	302	20 8
3	0 12	63	4 12	123	8 12	183	12 12	243	16 12	303	20 12
4	0 16	64	4 16	124	8 16	184	12 16	244	16 16	304	20 16
5	0 20	65	4 20	125	8 20	185	12 20	245	16 20	305	20 20
6	0 24	66	4 24	126	8 24	186	12 24	246	16 24	306	20 24
7	0 28	67	4 28	127	8 28	187	12 28	247	16 28	307	20 28
8	0 32	68	4 32	128	8 32	188	12 32	248	16 32	308	20 32
9	0 36	69	4 36	129	8 36	189	12 36	249	16 36	309	20 36
10	0 40	70	4 40	130	8 40	190	12 40	250	16 40	310	20 40
11	0 44	71	4 44	131	8 44	191	12 44	251	16 44	311	20 44
12	0 48	72	4 48	132	8 48	192	12 48	252	16 48	312	20 48
13	0 52	73	4 52	133	8 52	193	12 52	253	16 52	313	20 52
14	0 56	74	4 56	134	8 56	194	12 56	254	16 56	314	20 56
15	1 0	75	5 0	135	9 0	195	13 0	255	17 0	315	21 0
16	1 4	76	5 4	136	9 4	196	13 4	256	17 4	316	21 4
17	1 8	77	5 8	137	9 8	197	13 8	257	17 8	317	21 8
18	1 12	78	5 12	138	9 12	198	13 12	258	17 12	318	21 12
19	1 16	79	5 16	139	9 16	199	13 16	259	17 16	319	21 16
20	1 20	80	5 20	140	9 20	200	13 20	260	17 20	320	21 20
21	1 24	81	5 24	141	9 24	201	13 24	261	17 24	321	21 24
22	1 28	82	5 28	142	9 28	202	13 28	262	17 28	322	21 28
23	1 32	83	5 32	143	9 32	203	13 32	263	17 32	323	21 32
24	1 36	84	5 36	144	9 36	204	13 36	264	17 36	324	21 36
25	1 40	85	5 40	145	9 40	205	13 40	265	17 40	325	21 40
26	1 44	86	5 44	146	9 44	206	13 44	266	17 44	326	21 44
27	1 48	87	5 48	147	9 48	207	13 48	267	17 48	327	21 48
28	1 52	88	5 52	148	9 52	208	13 52	268	17 52	328	21 52
29	1 56	89	5 56	149	9 56	209	13 56	269	17 56	329	21 56
30	2 0	90	6 0	150	10 0	210	14 0	270	18 0	330	22 0
31	2 4	91	6 4	151	10 4	211	14 4	271	18 4	331	22 4
32	2 8	92	6 8	152	10 8	212	14 8	272	18 8	332	22 8
33	2 12	93	6 12	153	10 12	213	14 12	273	18 12	333	22 12
34	2 16	94	6 16	154	10 16	214	14 16	274	18 16	334	22 16
35	2 20	95	6 20	155	10 20	215	14 20	275	18 20	335	22 20
36	2 24	96	6 24	156	10 24	216	14 24	276	18 24	336	22 24
37	2 28	97	6 28	157	10 28	217	14 28	277	18 28	337	22 28
38	2 32	98	6 32	158	10 32	218	14 32	278	18 32	338	22 32
39	2 36	99	6 36	159	10 36	219	14 36	279	18 36	339	22 36
40	2 40	100	6 40	160	10 40	220	14 40	280	18 40	340	22 40
41	2 44	101	6 44	161	10 44	221	14 44	281	18 44	341	22 44
42	2 48	102	6 48	162	10 48	222	14 48	282	18 48	342	22 48
43	2 52	103	6 52	163	10 52	223	14 52	283	18 52	343	22 52
44	2 56	104	6 56	164	10 56	224	14 56	284	18 56	344	22 56
45	3 0	105	7 0	165	11 0	225	15 0	285	19 0	345	23 0
46	3 4	106	7 4	166	11 4	226	15 4	286	19 4	346	23 4
47	3 8	107	7 8	167	11 8	227	15 8	287	19 8	347	23 8
48	3 12	108	7 12	168	11 12	228	15 12	288	19 12	348	23 12
49	3 16	109	7 16	169	11 16	229	15 16	289	19 16	349	23 16
50	3 20	110	7 20	170	11 20	230	15 20	290	19 20	350	23 20
51	3 24	111	7 24	171	11 24	231	15 24	291	19 24	351	23 24
52	3 28	112	7 28	172	11 28	232	15 28	292	19 28	352	23 28
53	3 32	113	7 32	173	11 32	233	15 32	293	19 32	353	23 32
54	3 36	114	7 36	174	11 36	234	15 36	294	19 36	354	23 36
55	3 40	115	7 40	175	11 40	235	15 40	295	19 40	355	23 40
56	3 44	116	7 44	176	11 44	236	15 44	296	19 44	356	23 44
57	3 48	117	7 48	177	11 48	237	15 48	297	19 48	357	23 48
58	3 52	118	7 52	178	11 52	238	15 52	298	19 52	358	23 52
59	3 56	119	7 56	179	11 56	239	15 56	299	19 56	359	23 56
60	4 0	120	8 0	180	12 0	240	16 0	300	20 0	360	24 0

Note.—When turning seconds of arc into time, and vice versa, it should be remembered that the fractions are sixtieths; thus, the value in time of 42″ is not $2^{s}.48$, but $2^{s}\frac{48}{60}=2^{s}.8$.

TABLE 8.

Sidereal into Mean Solar Time.

To be subtracted from a sidereal time interval.

Sidereal.	0h	1h	2h	3h	4h	5h	6h	7h	For seconds.	
m.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	s.	s.
0	0 0.000	0 9.830	0 19.659	0 29.489	0 39.318	0 49.148	0 58.977	1 8.807		
1	0 0.164	0 9.993	0 19.823	0 29.653	0 39.482	0 49.312	0 59.141	1 8.971	1	0.003
2	0 0.328	0 10.157	0 19.987	0 29.816	0 39.646	0 49.475	0 59.305	1 9.135	2	.005
3	0 0.491	0 10.321	0 20.151	0 29.980	0 39.810	0 49.639	0 59.469	1 9.298	3	.008
4	0 0.655	0 10.485	0 20.314	0 30.144	0 39.974	0 49.803	0 59.633	1 9.462	4	.011
5	0 0.819	0 10.649	0 20.478	0 30.308	0 40.137	0 49.967	0 59.796	1 9.626	5	.014
6	0 0.983	0 10.813	0 20.642	0 30.472	0 40.301	0 50.131	0 59.960	1 9.790	6	.016
7	0 1.147	0 10.976	0 20.806	0 30.635	0 40.465	0 50.295	1 0.124	1 9.954	7	.019
8	0 1.311	0 11.140	0 20.970	0 30.799	0 40.629	0 50.458	1 0.288	1 10.118	8	.022
9	0 1.474	0 11.304	0 21.134	0 30.963	0 40.793	0 50.622	1 0.452	1 10.281	9	.025
10	0 1.638	0 11.468	0 21.297	0 31.127	0 40.956	0 50.786	1 0.616	1 10.445	10	.027
11	0 1.802	0 11.632	0 21.461	0 31.291	0 41.120	0 50.950	1 0.779	1 10.609	11	.030
12	0 1.966	0 11.795	0 21.625	0 31.455	0 41.284	0 51.114	1 0.943	1 10.773	12	.033
13	0 2.130	0 11.959	0 21.789	0 31.618	0 41.448	0 51.278	1 1.107	1 10.937	13	.035
14	0 2.294	0 12.123	0 21.953	0 31.782	0 41.612	0 51.441	1 1.271	1 11.100	14	.038
15	0 2.457	0 12.287	0 22.117	0 31.946	0 41.776	0 51.605	1 1.435	1 11.264	15	.041
16	0 2.621	0 12.451	0 22.280	0 32.110	0 41.939	0 51.769	1 1.599	1 11.428	16	.044
17	0 2.785	0 12.615	0 22.444	0 32.274	0 42.103	0 51.933	1 1.762	1 11.592	17	.046
18	0 2.949	0 12.778	0 22.608	0 32.438	0 42.267	0 52.097	1 1.926	1 11.756	18	.049
19	0 3.113	0 12.942	0 22.772	0 32.601	0 42.431	0 52.260	1 2.090	1 11.920	19	.052
20	0 3.277	0 13.106	0 22.936	0 32.765	0 42.595	0 52.424	1 2.254	1 12.083	20	.055
21	0 3.440	0 13.270	0 23.099	0 32.929	0 42.759	0 52.588	1 2.418	1 12.247	21	.057
22	0 3.604	0 13.434	0 23.263	0 33.093	0 42.922	0 52.752	1 2.582	1 12.411	22	.060
23	0 3.768	0 13.598	0 23.427	0 33.257	0 43.086	0 52.916	1 2.745	1 12.575	23	.063
24	0 3.932	0 13.761	0 23.591	0 33.420	0 43.250	0 53.080	1 2.909	1 12.739	24	.066
25	0 4.096	0 13.925	0 23.755	0 33.584	0 43.414	0 53.243	1 3.073	1 12.903	25	.068
26	0 4.259	0 14.089	0 23.919	0 33.748	0 43.578	0 53.407	1 3.237	1 13.066	26	.071
27	0 4.423	0 14.253	0 24.082	0 33.912	0 43.742	0 53.571	1 3.401	1 13.230	27	.074
28	0 4.587	0 14.417	0 24.246	0 34.076	0 43.905	0 53.735	1 3.564	1 13.394	28	.076
29	0 4.751	0 14.581	0 24.410	0 34.240	0 44.069	0 53.899	1 3.728	1 13.558	29	.079
30	0 4.915	0 14.744	0 24.574	0 34.403	0 44.233	0 54.063	1 3.892	1 13.722	30	.082
31	0 5.079	0 14.908	0 24.738	0 34.567	0 44.397	0 54.226	1 4.056	1 13.886	31	.085
32	0 5.242	0 15.072	0 24.902	0 34.731	0 44.561	0 54.390	1 4.220	1 14.049	32	.087
33	0 5.406	0 15.236	0 25.065	0 34.895	0 44.724	0 54.554	1 4.384	1 14.213	33	.090
34	0 5.570	0 15.400	0 25.229	0 35.059	0 44.888	0 54.718	1 4.547	1 14.377	34	.093
35	0 5.734	0 15.563	0 25.393	0 35.223	0 45.052	0 54.882	1 4.711	1 14.541	35	.096
36	0 5.898	0 15.727	0 25.557	0 35.386	0 45.216	0 55.046	1 4.875	1 14.705	36	.098
37	0 6.062	0 15.891	0 25.721	0 35.550	0 45.380	0 55.209	1 5.039	1 14.868	37	.101
38	0 6.225	0 16.055	0 25.885	0 35.714	0 45.544	0 55.373	1 5.203	1 15.032	38	.104
39	0 6.389	0 16.219	0 26.048	0 35.878	0 45.707	0 55.537	1 5.367	1 15.196	39	.106
40	0 6.553	0 16.383	0 26.212	0 36.042	0 45.871	0 55.701	1 5.530	1 15.360	40	.109
41	0 6.717	0 16.546	0 26.376	0 36.206	0 46.035	0 55.865	1 5.694	1 15.524	41	.112
42	0 6.881	0 16.710	0 26.540	0 36.369	0 46.199	0 56.028	1 5.858	1 15.688	42	.115
43	0 7.045	0 16.874	0 26.704	0 36.533	0 46.363	0 56.192	1 6.022	1 15.851	43	.117
44	0 7.208	0 17.038	0 26.867	0 36.697	0 46.527	0 56.356	1 6.186	1 16.015	44	.120
45	0 7.372	0 17.202	0 27.031	0 36.861	0 46.690	0 56.520	1 6.350	1 16.179	45	.123
46	0 7.536	0 17.366	0 27.195	0 37.025	0 46.854	0 56.684	1 6.513	1 16.343	46	.126
47	0 7.700	0 17.529	0 27.359	0 37.188	0 47.018	0 56.848	1 6.677	1 16.507	47	.128
48	0 7.864	0 17.693	0 27.523	0 37.352	0 47.182	0 57.011	1 6.841	1 16.671	48	.131
49	0 8.027	0 17.857	0 27.687	0 37.516	0 47.346	0 57.175	1 7.005	1 16.834	49	.134
50	0 8.191	0 18.021	0 27.850	0 37.680	0 47.510	0 57.339	1 7.169	1 16.998	50	.137
51	0 8.355	0 18.185	0 28.014	0 37.844	0 47.673	0 57.503	1 7.332	1 17.162	51	.139
52	0 8.519	0 18.349	0 28.178	0 38.008	0 47.837	0 57.667	1 7.496	1 17.326	52	.142
53	0 8.683	0 18.512	0 28.342	0 38.171	0 48.001	0 57.831	1 7.660	1 17.490	53	.145
54	0 8.847	0 18.676	0 28.506	0 38.335	0 48.165	0 57.994	1 7.824	1 17.654	54	.147
55	0 9.010	0 18.840	0 28.670	0 38.499	0 48.329	0 58.158	1 7.988	1 17.817	55	.150
56	0 9.174	0 19.004	0 28.833	0 38.663	0 48.492	0 58.322	1 8.152	1 17.981	56	.153
57	0 9.338	0 19.168	0 28.997	0 38.827	0 48.656	0 58.486	1 8.315	1 18.145	57	.156
58	0 9.502	0 19.331	0 29.161	0 38.991	0 48.820	0 58.650	1 8.479	1 18.309	58	.158
59	0 9.666	0 19.495	0 29.325	0 39.154	0 48.984	0 58.814	1 8.643	1 18.473	59	0.161

TABLE 8.

Sidereal into Mean Solar Time.

Sidereal.	To be subtracted from a sidereal time interval.									
	8^h	9^h	10^h	11^h	12^h	13^h	14^h	15^h	For seconds.	
m.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	s.	s.
0	1 18.636	1 28.466	1 38.296	1 48.125	1 57.955	2 7.784	2 17.614	2 27.443		
1	1 18.800	1 28.630	1 38.459	1 48.289	1 58.119	2 7.948	2 17.778	2 27.607	1	0.003
2	1 18.964	1 28.794	1 38.623	1 48.453	1 58.282	2 8.112	2 17.941	2 27.771	2	.005
3	1 19.128	1 28.958	1 38.787	1 48.617	1 58.446	2 8.276	2 18.105	2 27.935	3	.008
4	1 19.292	1 29.121	1 38.951	1 48.780	1 58.610	2 8.440	2 18.269	2 28.099	4	.011
5	1 19.456	1 29.285	1 39.115	1 48.944	1 58.774	2 8.603	2 18.433	2 28.263	5	.014
6	1 19.619	1 29.449	1 39.279	1 49.108	1 58.938	2 8.767	2 18.597	2 28.426	6	.016
7	1 19.783	1 29.613	1 39.442	1 49.272	1 59.101	2 8.931	2 18.761	2 28.590	7	.019
8	1 19.947	1 29.777	1 39.606	1 49.436	1 59.265	2 9.095	2 18.924	2 28.754	8	.022
9	1 20.111	1 29.940	1 39.770	1 49.600	1 59.429	2 9.259	2 19.088	2 28.918	9	.025
10	1 20.275	1 30.104	1 39.934	1 49.763	1 59.593	2 9.423	2 19.252	2 29.082	10	.027
11	1 20.439	1 30.268	1 40.098	1 49.927	1 59.757	2 9.586	2 19.416	2 29.245	11	.030
12	1 20.602	1 30.432	1 40.261	1 50.091	1 59.921	2 9.750	2 19.580	2 29.409	12	.033
13	1 20.766	1 30.596	1 40.425	1 50.255	2 0.084	2 9.914	2 19.744	2 29.573	13	.035
14	1 20.930	1 30.760	1 40.589	1 50.419	2 0.248	2 10.078	2 19.907	2 29.737	14	.038
15	1 21.094	1 30.923	1 40.753	1 50.583	2 0.412	2 10.242	2 20.071	2 29.901	15	.041
16	1 21.258	1 31.087	1 40.917	1 50.746	2 0.576	2 10.405	2 20.235	2 30.065	16	.044
17	1 21.422	1 31.251	1 41.081	1 50.910	2 0.740	2 10.569	2 20.399	2 30.228	17	.046
18	1 21.585	1 31.415	1 41.244	1 51.074	2 0.904	2 10.733	2 20.563	2 30.392	18	.049
19	1 21.749	1 31.579	1 41.408	1 51.238	2 1.067	2 10.897	2 20.727	2 30.556	19	.052
20	1 21.913	1 31.743	1 41.572	1 51.402	2 1.231	2 11.061	2 20.890	2 30.720	20	.055
21	1 22.077	1 31.906	1 41.736	1 51.565	2 1.395	2 11.225	2 21.054	2 30.884	21	.057
22	1 22.241	1 32.070	1 41.900	1 51.729	2 1.559	2 11.388	2 21.218	2 31.048	22	.060
23	1 22.404	1 32.234	1 42.064	1 51.893	2 1.723	2 11.552	2 21.382	2 31.211	23	.063
24	1 22.568	1 32.398	1 42.227	1 52.057	2 1.887	2 11.716	2 21.546	2 31.375	24	.066
25	1 22.732	1 32.562	1 42.391	1 52.221	2 2.050	2 11.880	2 21.709	2 31.539	25	.068
26	1 22.896	1 32.726	1 42.555	1 52.385	2 2.214	2 12.044	2 21.873	2 31.703	26	.071
27	1 23.060	1 32.889	1 42.719	1 52.548	2 2.378	2 12.208	2 22.037	2 31.867	27	.074
28	1 23.224	1 33.053	1 42.883	1 52.712	2 2.542	2 12.371	2 22.201	2 32.031	28	.076
29	1 23.387	1 33.217	1 43.047	1 52.876	2 2.706	2 12.535	2 22.365	2 32.194	29	.079
30	1 23.551	1 33.381	1 43.210	1 53.040	2 2.869	2 12.699	2 22.529	2 32.358	30	.082
31	1 23.715	1 33.545	1 43.374	1 53.204	2 3.033	2 12.863	2 22.692	2 32.522	31	.085
32	1 23.879	1 33.708	1 43.538	1 53.368	2 3.197	2 13.027	2 22.856	2 32.686	32	.087
33	1 24.043	1 33.872	1 43.702	1 53.531	2 3.361	2 13.191	2 23.020	2 32.850	33	.090
34	1 24.207	1 34.036	1 43.866	1 53.695	2 3.525	2 13.354	2 23.184	2 33.013	34	.093
35	1 24.370	1 34.200	1 44.029	1 53.859	2 3.689	2 13.518	2 23.348	2 33.177	35	.096
36	1 24.534	1 34.364	1 44.193	1 54.023	2 3.852	2 13.682	2 23.512	2 33.341	36	.098
37	1 24.698	1 34.528	1 44.357	1 54.187	2 4.016	2 13.846	2 23.675	2 33.505	37	.101
38	1 24.862	1 34.691	1 44.521	1 54.351	2 4.180	2 14.010	2 23.839	2 33.669	38	.104
39	1 25.026	1 34.855	1 44.685	1 54.514	2 4.344	2 14.173	2 24.003	2 33.833	39	.106
40	1 25.190	1 35.019	1 44.849	1 54.678	2 4.508	2 14.337	2 24.167	2 33.996	40	.109
41	1 25.353	1 35.183	1 45.012	1 54.842	2 4.672	2 14.501	2 24.331	2 34.160	41	.112
42	1 25.517	1 35.347	1 45.176	1 55.006	2 4.835	2 14.665	2 24.495	2 34.324	42	.115
43	1 25.681	1 35.511	1 45.340	1 55.170	2 4.999	2 14.829	2 24.658	2 34.488	43	.117
44	1 25.845	1 35.674	1 45.504	1 55.333	2 5.163	2 14.993	2 24.822	2 34.652	44	.120
45	1 26.009	1 35.838	1 45.668	1 55.497	2 5.327	2 15.156	2 24.986	2 34.816	45	.123
46	1 26.172	1 36.002	1 45.832	1 55.661	2 5.491	2 15.320	2 25.150	2 34.979	46	.126
47	1 26.336	1 36.166	1 45.995	1 55.825	2 5.655	2 15.484	2 25.314	2 35.143	47	.128
48	1 26.500	1 36.330	1 46.159	1 55.989	2 5.818	2 15.648	2 25.477	2 35.307	48	.131
49	1 26.664	1 36.493	1 46.323	1 56.153	2 5.982	2 15.812	2 25.641	2 35.471	49	.134
50	1 26.828	1 36.657	1 46.487	1 56.316	2 6.146	2 15.976	2 25.805	2 35.635	50	.137
51	1 26.992	1 36.821	1 46.651	1 56.480	2 6.310	2 16.139	2 25.969	2 35.798	51	.139
52	1 27.155	1 36.985	1 46.815	1 56.644	2 6.474	2 16.303	2 26.133	2 35.962	52	.142
53	1 27.319	1 37.149	1 46.978	1 56.808	2 6.637	2 16.467	2 26.297	2 36.126	53	.145
54	1 27.483	1 37.313	1 47.142	1 56.972	2 6.801	2 16.631	2 26.460	2 36.290	54	.147
55	1 27.647	1 37.476	1 47.306	1 57.136	2 6.965	2 16.795	2 26.624	2 36.454	55	.150
56	1 27.811	1 37.640	1 47.470	1 57.299	2 7.129	2 16.959	2 26.788	2 36.618	56	.153
57	1 27.975	1 37.804	1 47.634	1 57.463	2 7.293	2 17.122	2 26.952	2 36.781	57	.156
58	1 28.138	1 37.968	1 47.797	1 57.627	2 7.457	2 17.286	2 27.116	2 36.945	58	.158
59	1 28.302	1 38.132	1 47.961	1 57.791	2 7.620	2 17.450	2 27.280	2 37.109	59	0.161

TABLE 8.

Sidereal into Mean Solar Time.

Sidereal.	To be subtracted from a sidereal time interval.								For seconds.	
	16^h	17^h	18^h	19^h	20^h	21^h	22^h	23^h		
m.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	s.	s.
0	2 37.273	2 47.102	2 56.932	3 6.762	3 16.591	3 26.421	3 36.250	3 46.080		
1	2 37.437	2 47.266	2 57.096	3 6.925	3 16.755	3 26.585	3 36.414	3 46.244	1	0.003
2	2 37.601	2 47.430	2 57.260	3 7.089	3 16.919	3 26.748	3 36.578	3 46.407	2	.005
3	2 37.764	2 47.594	2 57.424	3 7.253	3 17.083	3 26.912	3 36.742	3 46.571	3	.008
4	2 37.928	2 47.758	2 57.587	3 7.417	3 17.246	3 27.076	3 36.906	3 46.735	4	.011
5	2 38.092	2 47.922	2 57.751	3 7.581	3 17.410	3 27.240	3 37.069	3 46.899	5	.014
6	2 38.256	2 48.085	2 57.915	3 7.745	3 17.574	3 27.404	3 37.233	3 47.063	6	.016
7	2 38.420	2 48.249	2 58.079	3 7.908	3 17.738	3 27.568	3 37.397	3 47.227	7	.019
8	2 38.584	2 48.413	2 58.243	3 8.072	3 17.902	3 27.731	3 37.561	3 47.390	8	.022
9	2 38.747	2 48.577	2 58.406	3 8.236	3 18.066	3 27.895	3 37.725	3 47.554	9	.025
10	2 38.911	2 48.741	2 58.570	3 8.400	3 18.229	3 28.059	3 37.889	3 47.718	10	.027
11	2 39.075	2 48.905	2 58.734	3 8.564	3 18.393	3 28.223	3 38.052	3 47.882	11	.030
12	2 39.239	2 49.068	2 58.898	3 8.728	3 18.557	3 28.387	3 38.216	3 48.046	12	.033
13	2 39.403	2 49.232	2 59.062	3 8.891	3 18.721	3 28.550	3 38.380	3 48.210	13	.035
14	2 39.566	2 49.396	2 59.226	3 9.055	3 18.885	3 28.714	3 38.544	3 48.373	14	.038
15	2 39.730	2 49.560	2 59.389	3 9.219	3 19.049	3 28.878	3 38.708	3 48.537	15	.041
16	2 39.894	2 49.724	2 59.553	3 9.383	3 19.212	3 29.042	3 38.871	3 48.701	16	.044
17	2 40.058	2 49.888	2 59.717	3 9.547	3 19.376	3 29.206	3 39.035	3 48.865	17	.046
18	2 40.222	2 50.051	2 59.881	3 9.710	3 19.540	3 29.370	3 39.199	3 49.029	18	.049
19	2 40.386	2 50.215	3 0.045	3 9.874	3 19.704	3 29.533	3 39.363	3 49.193	19	.052
20	2 40.549	2 50.379	3 0.209	3 10.038	3 19.868	3 29.697	3 39.527	3 49.356	20	.055
21	2 40.713	2 50.543	3 0.372	3 10.202	3 20.032	3 29.861	3 39.691	3 49.520	21	.057
22	2 40.877	2 50.707	3 0.536	3 10.366	3 20.195	3 30.025	3 39.854	3 49.684	22	.060
23	2 41.041	2 50.870	3 0.700	3 10.530	3 20.359	3 30.189	3 40.018	3 49.848	23	.063
24	2 41.205	2 51.034	3 0.864	3 10.693	3 20.523	3 30.353	3 40.182	3 50.012	24	.066
25	2 41.369	2 51.198	3 1.028	3 10.857	3 20.687	3 30.516	3 40.346	3 50.175	25	.068
26	2 41.532	2 51.362	3 1.192	3 11.021	3 20.851	3 30.680	3 40.510	3 50.339	26	.071
27	2 41.696	2 51.526	3 1.355	3 11.185	3 21.014	3 30.844	3 40.674	3 50.503	27	.074
28	2 41.860	2 51.690	3 1.519	3 11.349	3 21.178	3 31.008	3 40.837	3 50.667	28	.076
29	2 42.024	2 51.853	3 1.683	3 11.513	3 21.342	3 31.172	3 41.001	3 50.831	29	.079
30	2 42.188	2 52.017	3 1.847	3 11.676	3 21.506	3 31.336	3 41.165	3 50.995	30	.082
31	2 42.352	2 52.181	3 2.011	3 11.840	3 21.670	3 31.499	3 41.329	3 51.158	31	.085
32	2 42.515	2 52.345	3 2.174	3 12.004	3 21.834	3 31.663	3 41.493	3 51.322	32	.087
33	2 42.679	2 52.509	3 2.338	3 12.168	3 21.997	3 31.827	3 41.657	3 51.486	33	.090
34	2 42.843	2 52.673	3 2.502	3 12.332	3 22.161	3 31.991	3 41.820	3 51.650	34	.093
35	2 43.007	2 52.836	3 2.666	3 12.496	3 22.325	3 32.155	3 41.984	3 51.814	35	.096
36	2 43.171	2 53.000	3 2.830	3 12.659	3 22.489	3 32.318	3 42.148	3 51.978	36	.098
37	2 43.334	2 53.164	3 2.994	3 12.823	3 22.653	3 32.482	3 42.312	3 52.141	37	.101
38	2 43.498	2 53.328	3 3.157	3 12.987	3 22.817	3 32.646	3 42.476	3 52.305	38	.104
39	2 43.662	2 53.492	3 3.321	3 13.151	3 22.980	3 32.810	3 42.639	3 52.469	39	.106
40	2 43.826	2 53.656	3 3.485	3 13.315	3 23.144	3 32.974	3 42.803	3 52.633	40	.109
41	2 43.990	2 53.819	3 3.649	3 13.478	3 23.308	3 33.138	3 42.967	3 52.797	41	.112
42	2 44.154	2 53.983	3 3.813	3 13.642	3 23.472	3 33.301	3 43.131	3 52.961	42	.115
43	2 44.317	2 54.147	3 3.977	3 13.806	3 23.636	3 33.465	3 43.295	3 53.124	43	.117
44	2 44.481	2 54.311	3 4.140	3 13.970	3 23.800	3 33.629	3 43.459	3 53.288	44	.120
45	2 44.645	2 54.475	3 4.304	3 14.134	3 23.963	3 33.793	3 43.622	3 53.452	45	.123
46	2 44.809	2 54.638	3 4.468	3 14.298	3 24.127	3 33.957	3 43.786	3 53.616	46	.126
47	2 44.973	2 54.802	3 4.632	3 14.461	3 24.291	3 34.121	3 43.950	3 53.780	47	.128
48	2 45.137	2 54.966	3 4.796	3 14.625	3 24.455	3 34.284	3 44.114	3 53.943	48	.131
49	2 45.300	2 55.130	3 4.960	3 14.789	3 24.619	3 34.448	3 44.278	3 54.107	49	.134
50	2 45.464	2 55.294	3 5.123	3 14.953	3 24.782	3 34.612	3 44.442	3 54.271	50	.137
51	2 45.628	2 55.458	3 5.287	3 15.117	3 24.946	3 34.776	3 44.605	3 54.435	51	.139
52	2 45.792	2 55.621	3 5.451	3 15.281	3 25.110	3 34.940	3 44.769	3 54.599	52	.142
53	2 45.956	2 55.785	3 5.615	3 15.444	3 25.274	3 35.104	3 44.933	3 54.763	53	.145
54	2 46.120	2 55.949	3 5.779	3 15.608	3 25.438	3 35.267	3 45.097	3 54.926	54	.147
55	2 46.283	2 56.113	3 5.942	3 15.772	3 25.602	3 35.431	3 45.261	3 55.090	55	.150
56	2 46.447	2 56.277	3 6.106	3 15.936	3 25.765	3 35.595	3 45.425	3 55.254	56	.153
57	2 46.611	2 56.441	3 6.270	3 16.100	3 25.929	3 35.759	3 45.588	3 55.418	57	.156
58	2 46.755	2 56.604	3 6.434	3 16.264	3 26.093	3 35.923	3 45.752	3 55.582	58	.158
59	2 46.939	2 56.768	3 6.598	3 16.427	3 26.257	3 36.086	3 45.916	3 55.746	59	0.161

TABLE 9.

Mean Solar into Sidereal Time.

To be added to a mean time interval.

Mean.	0h	1h	2h	3h	4h	5h	6h	7h	For seconds.	
m.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	s.	s.
0	0 0.000	0 9.856	0 19.713	0 29.569	0 39.426	0 49.282	0 59.139	1 8.995		
1	0 0.164	0 10.021	0 19.877	0 29.734	0 39.590	0 49.447	0 59.303	1 9.160	1	0.003
2	0 0.329	0 10.185	0 20.041	0 29.898	0 39.754	0 49.611	0 59.467	1 9.324	2	.005
3	0 0.493	0 10.349	0 20.206	0 30.062	0 39.919	0 49.775	0 59.632	1 9.488	3	.008
4	0 0.657	0 10.514	0 20.370	0 30.227	0 40.083	0 49.939	0 59.796	1 9.652	4	.011
5	0 0.821	0 10.678	0 20.534	0 30.391	0 40.247	0 50.104	0 59.960	1 9.817	5	.014
6	0 0.986	0 10.842	0 20.699	0 30.555	0 40.412	0 50.268	1 0.124	1 9.981	6	.016
7	0 1.150	0 11.006	0 20.863	0 30.719	0 40.576	0 50.432	1 0.289	1 10.145	7	.019
8	0 1.314	0 11.171	0 21.027	0 30.884	0 40.740	0 50.597	1 0.453	1 10.310	8	.022
9	0 1.478	0 11.335	0 21.191	0 31.048	0 40.904	0 50.761	1 0.617	1 10.474	9	.025
10	0 1.643	0 11.499	0 21.356	0 31.212	0 41.069	0 50.925	1 0.782	1 10.638	10	.027
11	0 1.807	0 11.663	0 21.520	0 31.376	0 41.233	0 51.089	1 0.946	1 10.802	11	.030
12	0 1.971	0 11.828	0 21.684	0 31.541	0 41.397	0 51.254	1 1.110	1 10.967	12	.033
13	0 2.136	0 11.992	0 21.849	0 31.705	0 41.561	0 51.418	1 1.274	1 11.131	13	.036
14	0 2.300	0 12.156	0 22.013	0 31.869	0 41.726	0 51.582	1 1.439	1 11.295	14	.038
15	0 2.464	0 12.321	0 22.177	0 32.034	0 41.890	0 51.746	1 1.603	1 11.459	15	.041
16	0 2.628	0 12.485	0 22.341	0 32.198	0 42.054	0 51.911	1 1.767	1 11.624	16	.044
17	0 2.793	0 12.649	0 22.506	0 32.362	0 42.219	0 52.075	1 1.932	1 11.788	17	.047
18	0 2.957	0 12.813	0 22.670	0 32.526	0 42.383	0 52.239	1 2.096	1 11.952	18	.049
19	0 3.121	0 12.978	0 22.834	0 32.691	0 42.547	0 52.404	1 2.260	1 12.117	19	.052
20	0 3.285	0 13.142	0 22.998	0 32.855	0 42.711	0 52.568	1 2.424	1 12.281	20	.055
21	0 3.450	0 13.306	0 23.163	0 33.019	0 42.876	0 52.732	1 2.589	1 12.445	21	.057
22	0 3.614	0 13.471	0 23.327	0 33.183	0 43.040	0 52.896	1 2.753	1 12.609	22	.060
23	0 3.778	0 13.635	0 23.491	0 33.348	0 43.204	0 53.061	1 2.917	1 12.774	23	.063
24	0 3.943	0 13.799	0 23.656	0 33.512	0 43.368	0 53.225	1 3.081	1 12.938	24	.066
25	0 4.107	0 13.963	0 23.820	0 33.676	0 43.533	0 53.389	1 3.246	1 13.102	25	.068
26	0 4.271	0 14.128	0 23.984	0 33.841	0 43.697	0 53.554	1 3.410	1 13.266	26	.071
27	0 4.435	0 14.292	0 24.148	0 34.005	0 43.861	0 53.718	1 3.574	1 13.431	27	.074
28	0 4.600	0 14.456	0 24.313	0 34.169	0 44.026	0 53.882	1 3.739	1 13.595	28	.077
29	0 4.764	0 14.620	0 24.477	0 34.333	0 44.190	0 54.046	1 3.903	1 13.759	29	.079
30	0 4.928	0 14.785	0 24.641	0 34.498	0 44.354	0 54.211	1 4.067	1 13.924	30	.082
31	0 5.093	0 14.949	0 24.805	0 34.662	0 44.518	0 54.375	1 4.231	1 14.088	31	.085
32	0 5.257	0 15.113	0 24.970	0 34.826	0 44.683	0 54.539	1 4.396	1 14.252	32	.088
33	0 5.421	0 15.278	0 25.134	0 34.990	0 44.847	0 54.703	1 4.560	1 14.416	33	.090
34	0 5.585	0 15.442	0 25.298	0 35.155	0 45.011	0 54.868	1 4.724	1 14.581	34	.093
35	0 5.750	0 15.606	0 25.463	0 35.319	0 45.176	0 55.032	1 4.888	1 14.745	35	.096
36	0 5.914	0 15.770	0 25.627	0 35.483	0 45.340	0 55.196	1 5.053	1 14.909	36	.099
37	0 6.078	0 15.935	0 25.791	0 35.648	0 45.504	0 55.361	1 5.217	1 15.073	37	.101
38	0 6.242	0 16.099	0 25.955	0 35.812	0 45.668	0 55.525	1 5.381	1 15.238	38	.104
39	0 6.407	0 16.263	0 26.120	0 35.976	0 45.833	0 55.689	1 5.546	1 15.402	39	.107
40	0 6.571	0 16.427	0 26.284	0 36.140	0 45.997	0 55.853	1 5.710	1 15.566	40	.110
41	0 6.735	0 16.592	0 26.448	0 36.305	0 46.161	0 56.018	1 5.874	1 15.731	41	.112
42	0 6.900	0 16.756	0 26.612	0 36.469	0 46.325	0 56.182	1 6.038	1 15.895	42	.115
43	0 7.064	0 16.920	0 26.777	0 36.633	0 46.490	0 56.346	1 6.203	1 16.059	43	.118
44	0 7.228	0 17.085	0 26.941	0 36.798	0 46.654	0 56.510	1 6.367	1 16.223	44	.120
45	0 7.392	0 17.249	0 27.105	0 36.962	0 46.818	0 56.675	1 6.531	1 16.388	45	.123
46	0 7.557	0 17.413	0 27.270	0 37.126	0 46.983	0 56.839	1 6.695	1 16.552	46	.126
47	0 7.721	0 17.577	0 27.434	0 37.290	0 47.147	0 57.003	1 6.860	1 16.716	47	.129
48	0 7.885	0 17.742	0 27.598	0 37.455	0 47.311	0 57.168	1 7.024	1 16.881	48	.131
49	0 8.049	0 17.906	0 27.762	0 37.619	0 47.475	0 57.332	1 7.188	1 17.045	49	.134
50	0 8.214	0 18.070	0 27.927	0 37.783	0 47.640	0 57.496	1 7.353	1 17.209	50	.137
51	0 8.378	0 18.234	0 28.091	0 37.947	0 47.804	0 57.660	1 7.517	1 17.373	51	.140
52	0 8.542	0 18.399	0 28.255	0 38.112	0 47.968	0 57.825	1 7.681	1 17.538	52	.142
53	0 8.707	0 18.563	0 28.420	0 38.276	0 48.132	0 57.989	1 7.845	1 17.702	53	.145
54	0 8.871	0 18.727	0 28.584	0 38.440	0 48.297	0 58.153	1 8.010	1 17.866	54	.148
55	0 9.035	0 18.892	0 28.748	0 38.605	0 48.461	0 58.317	1 8.174	1 18.030	55	.151
56	0 9.199	0 19.056	0 28.912	0 38.769	0 48.625	0 58.482	1 8.338	1 18.195	56	.153
57	0 9.364	0 19.220	0 29.077	0 38.933	0 48.790	0 58.646	1 8.502	1 18.359	57	.156
58	0 9.528	0 19.384	0 29.241	0 39.097	0 48.954	0 58.810	1 8.667	1 18.523	58	.159
59	0 9.692	0 19.549	0 29.405	0 39.262	0 49.118	0 58.975	1 8.831	1 18.688	59	0.162

TABLE 9.

Mean Solar into Sidereal Time.

Mean.	To be added to a mean time interval.								For seconds.	
	8^h	9^h	10^h	11^h	12^h	13^h	14^h	15^h		
m.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	s.	s.
0	1 18.852	1 28.708	1 38.565	1 48.421	1 58.278	2 8.134	2 17.991	2 27.847		
1	1 19.016	1 28.873	1 38.729	1 48.585	1 58.442	2 8.298	2 18.155	2 28.011	1	0.003
2	1 19.180	1 29.037	1 38.893	1 48.750	1 58.606	2 8.463	2 18.319	2 28.176	2	.005
3	1 19.345	1 29.201	1 39.058	1 48.914	1 58.771	2 8.627	2 18.483	2 28.340	3	.008
4	1 19.509	1 29.365	1 39.222	1 49.078	1 58.935	2 8.791	2 18.648	2 28.504	4	.011
5	1 19.673	1 29.530	1 39.386	1 49.243	1 59.099	2 8.956	2 18.812	2 28.668	5	.014
6	1 19.837	1 29.694	1 39.550	1 49.407	1 59.263	2 9.120	2 18.976	2 28.833	6	.016
7	1 20.002	1 29.858	1 39.715	1 49.571	1 59.428	2 9.284	2 19.141	2 28.997	7	.019
8	1 20.166	1 30.022	1 39.879	1 49.735	1 59.592	2 9.448	2 19.305	2 29.161	8	.022
9	1 20.330	1 30.187	1 40.043	1 49.900	1 59.756	2 9.613	2 19.469	2 29.326	9	.025
10	1 20.495	1 30.351	1 40.207	1 50.064	1 59.920	2 9.777	2 19.633	2 29.490	10	.027
11	1 20.659	1 30.515	1 40.372	1 50.228	2 0.085	2 9.941	2 19.798	2 29.654	11	.030
12	1 20.823	1 30.680	1 40.536	1 50.393	2 0.249	2 10.105	2 19.962	2 29.818	12	.033
13	1 20.987	1 30.844	1 40.700	1 50.557	2 0.413	2 10.270	2 20.126	2 29.983	13	.036
14	1 21.152	1 31.008	1 40.865	1 50.721	2 0.578	2 10.434	2 20.290	2 30.147	14	.038
15	1 21.316	1 31.172	1 41.029	1 50.885	2 0.742	2 10.598	2 20.455	2 30.311	15	.041
16	1 21.480	1 31.337	1 41.193	1 51.050	2 0.906	2 10.763	2 20.619	2 30.476	16	.044
17	1 21.644	1 31.501	1 41.357	1 51.214	2 1.070	2 10.927	2 20.783	2 30.640	17	.047
18	1 21.809	1 31.665	1 41.522	1 51.378	2 1.235	2 11.091	2 20.948	2 30.804	18	.049
19	1 21.973	1 31.829	1 41.686	1 51.542	2 1.399	2 11.255	2 21.112	2 30.968	19	.052
20	1 22.137	1 31.994	1 41.850	1 51.707	2 1.563	2 11.420	2 21.276	2 31.133	20	.055
21	1 22.302	1 32.158	1 42.015	1 51.871	2 1.727	2 11.584	2 21.440	2 31.297	21	.057
22	1 22.466	1 32.322	1 42.179	1 52.035	2 1.892	2 11.748	2 21.605	2 31.461	22	.060
23	1 22.630	1 32.487	1 42.343	1 52.200	2 2.056	2 11.912	2 21.769	2 31.625	23	.063
24	1 22.794	1 32.651	1 42.507	1 52.364	2 2.220	2 12.077	2 21.933	2 31.790	24	.066
25	1 22.959	1 32.815	1 42.672	1 52.528	2 2.385	2 12.241	2 22.098	2 31.954	25	.068
26	1 23.123	1 32.979	1 42.836	1 52.692	2 2.549	2 12.405	2 22.262	2 32.118	26	.071
27	1 23.287	1 33.144	1 43.000	1 52.857	2 2.713	2 12.570	2 22.426	2 32.283	27	.074
28	1 23.451	1 33.308	1 43.164	1 53.021	2 2.877	2 12.734	2 22.590	2 32.447	28	.077
29	1 23.616	1 33.472	1 43.329	1 53.185	2 3.042	2 12.898	2 22.755	2 32.611	29	.079
30	1 23.780	1 33.637	1 43.493	1 53.349	2 3.206	2 13.062	2 22.919	2 32.775	30	.082
31	1 23.944	1 33.801	1 43.657	1 53.514	2 3.370	2 13.227	2 23.083	2 32.940	31	.085
32	1 24.109	1 33.965	1 43.822	1 53.678	2 3.534	2 13.391	2 23.247	2 33.104	32	.088
33	1 24.273	1 34.129	1 43.986	1 53.842	2 3.699	2 13.555	2 23.412	2 33.268	33	.090
34	1 24.437	1 34.294	1 44.150	1 54.007	2 3.863	2 13.720	2 23.576	2 33.432	34	.093
35	1 24.601	1 34.458	1 44.314	1 54.171	2 4.027	2 13.884	2 23.740	2 33.597	35	.096
36	1 24.766	1 34.622	1 44.479	1 54.335	2 4.192	2 14.048	2 23.905	2 33.761	36	.099
37	1 24.930	1 34.786	1 44.643	1 54.499	2 4.356	2 14.212	2 24.069	2 33.925	37	.101
38	1 25.094	1 34.951	1 44.807	1 54.664	2 4.520	2 14.377	2 24.233	2 34.090	38	.104
39	1 25.259	1 35.115	1 44.971	1 54.828	2 4.684	2 14.541	2 24.397	2 34.254	39	.107
40	1 25.423	1 35.279	1 45.136	1 54.992	2 4.849	2 14.705	2 24.562	2 34.418	40	.110
41	1 25.587	1 35.444	1 45.300	1 55.156	2 5.013	2 14.869	2 24.726	2 34.582	41	.112
42	1 25.751	1 35.608	1 45.464	1 55.321	2 5.177	2 15.034	2 24.890	2 34.747	42	.115
43	1 25.916	1 35.772	1 45.629	1 55.485	2 5.342	2 15.198	2 25.054	2 34.911	43	.118
44	1 26.080	1 35.936	1 45.793	1 55.649	2 5.506	2 15.362	2 25.219	2 35.075	44	.120
45	1 26.244	1 36.101	1 45.957	1 55.814	2 5.670	2 15.527	2 25.383	2 35.239	45	.123
46	1 26.408	1 36.265	1 46.121	1 55.978	2 5.834	2 15.691	2 25.547	2 35.404	46	.126
47	1 26.573	1 36.429	1 46.286	1 56.142	2 5.999	2 15.855	2 25.712	2 35.568	47	.129
48	1 26.737	1 36.593	1 46.450	1 56.306	2 6.163	2 16.019	2 25.876	2 35.732	48	.131
49	1 26.901	1 36.758	1 46.614	1 56.471	2 6.327	2 16.184	2 26.040	2 35.897	49	.134
50	1 27.066	1 36.922	1 46.778	1 56.635	2 6.491	2 16.348	2 26.204	2 36.061	50	.137
51	1 27.230	1 37.086	1 46.943	1 56.799	2 6.656	2 16.512	2 26.369	2 36.225	51	.140
52	1 27.394	1 37.251	1 47.107	1 56.964	2 6.820	2 16.676	2 26.533	2 36.389	52	.142
53	1 27.558	1 37.415	1 47.271	1 57.128	2 6.984	2 16.841	2 26.697	2 36.554	53	.145
54	1 27.723	1 37.579	1 47.436	1 57.292	2 7.149	2 17.005	2 26.861	2 36.718	54	.148
55	1 27.887	1 37.743	1 47.600	1 57.456	2 7.313	2 17.169	2 27.026	2 36.882	55	.151
56	1 28.051	1 37.908	1 47.764	1 57.621	2 7.477	2 17.334	2 27.190	2 37.047	56	.153
57	1 28.215	1 38.072	1 47.928	1 57.785	2 7.641	2 17.498	2 27.354	2 37.211	57	.156
58	1 28.380	1 38.236	1 48.093	1 57.949	2 7.806	2 17.662	2 27.519	2 37.375	58	.159
59	1 28.544	1 38.400	1 48.257	1 58.113	2 7.970	2 17.826	2 27.683	2 37.539	59	0.162

TABLE 9.

Mean Solar into Sidereal time.

To be added to a mean time interval.

Mean.	16h	17h	18h	19h	20h	21h	22h	23h	For seconds.	
m.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	s.	s.
0	2 37.704	2 47.560	2 57.417	3 7.273	3 17.129	3 26.986	3 36.842	3 46.699		
1	2 37.868	2 47.724	2 57.581	3 7.437	3 17.294	3 27.150	3 37.007	3 46.863	1	0.003
2	2 38.032	2 47.889	2 57.745	3 7.602	3 17.458	3 27.315	3 37.171	3 47.027	2	.005
3	2 38.196	2 48.053	2 57.909	3 7.766	3 17.622	3 27.479	3 37.335	3 47.192	3	.008
4	2 38.361	2 48.217	2 58.074	3 7.930	3 17.787	3 27.643	3 37.500	3 47.356	4	.011
5	2 38.525	2 48.381	2 58.238	3 8.094	3 17.951	3 27.807	3 37.664	3 47.520	5	.014
6	2 38.689	2 48.546	2 58.402	3 8.259	3 18.115	3 27.972	3 37.828	3 47.685	6	.016
7	2 38.854	2 48.710	2 58.566	3 8.423	3 18.279	3 28.136	3 37.992	3 47.849	7	.019
8	2 39.018	2 48.874	2 58.731	3 8.587	3 18.444	3 28.300	3 38.157	3 48.013	8	.022
9	2 39.182	2 49.039	2 58.895	3 8.751	3 18.608	3 28.464	3 38.321	3 48.177	9	.025
10	2 39.346	2 49.203	2 59.059	3 8.916	3 18.772	3 28.629	3 38.485	3 48.342	10	.027
11	2 39.511	2 49.367	2 59.224	3 9.080	3 18.937	3 28.793	3 38.649	3 48.506	11	.030
12	2 39.675	2 49.531	2 59.388	3 9.244	3 19.101	3 28.957	3 38.814	3 48.670	12	.033
13	2 39.839	2 49.696	2 59.552	3 9.409	3 19.265	3 29.122	3 38.978	3 48.834	13	.036
14	2 40.003	2 49.860	2 59.716	3 9.573	3 19.429	3 29.286	3 39.142	3 48.999	14	.038
15	2 40.168	2 50.024	2 59.881	3 9.737	3 19.594	3 29.450	3 39.307	3 49.163	15	.041
16	2 40.332	2 50.188	3 0.045	3 9.901	3 19.758	3 29.614	3 39.471	3 49.327	16	.044
17	2 40.496	2 50.353	3 0.209	3 10.066	3 19.922	3 29.779	3 39.635	3 49.492	17	.047
18	2 40.661	2 50.517	3 0.373	3 10.230	3 20.086	3 29.943	3 39.799	3 49.656	18	.049
19	2 40.825	2 50.681	3 0.538	3 10.394	3 20.251	3 30.107	3 39.964	3 49.820	19	.052
20	2 40.989	2 50.846	3 0.702	3 10.559	3 20.415	3 30.271	3 40.128	3 49.984	20	.055
21	2 41.153	2 51.010	3 0.866	3 10.723	3 20.579	3 30.436	3 40.292	3 50.149	21	.057
22	2 41.318	2 51.174	3 1.031	3 10.887	3 20.744	3 30.600	3 40.456	3 50.313	22	.060
23	2 41.482	2 51.338	3 1.195	3 11.051	3 20.908	3 30.764	3 40.621	3 50.477	23	.063
24	2 41.646	2 51.503	3 1.359	3 11.216	3 21.072	3 30.929	3 40.785	3 50.642	24	.066
25	2 41.810	2 51.667	3 1.523	3 11.380	3 21.236	3 31.093	3 40.949	3 50.806	25	.068
26	2 41.975	2 51.831	3 1.688	3 11.544	3 21.401	3 31.257	3 41.114	3 50.970	26	.071
27	2 42.139	2 51.995	3 1.852	3 11.708	3 21.565	3 31.421	3 41.278	3 51.134	27	.074
28	2 42.303	2 52.160	3 2.016	3 11.873	3 21.729	3 31.586	3 41.442	3 51.299	28	.077
29	2 42.468	2 52.324	3 2.181	3 12.037	3 21.893	3 31.750	3 41.606	3 51.463	29	.079
30	2 42.632	2 52.488	3 2.345	3 12.201	3 22.058	3 31.914	3 41.771	3 51.627	30	.082
31	2 42.796	2 52.653	3 2.509	3 12.366	3 22.222	3 32.078	3 41.935	3 51.791	31	.085
32	2 42.960	2 52.817	3 2.673	3 12.530	3 22.386	3 32.243	3 42.099	3 51.956	32	.088
33	2 43.125	2 52.981	3 2.838	3 12.694	3 22.551	3 32.407	3 42.264	3 52.120	33	.090
34	2 43.289	2 53.145	3 3.002	3 12.858	3 22.715	3 32.571	3 42.428	3 52.284	34	.093
35	2 43.453	2 53.310	3 3.166	3 13.023	3 22.879	3 32.736	3 42.592	3 52.449	35	.096
36	2 43.617	2 53.474	3 3.330	3 13.187	3 23.043	3 32.900	3 42.756	3 52.613	36	.099
37	2 43.782	2 53.638	3 3.495	3 13.351	3 23.208	3 33.064	3 42.921	3 52.777	37	.101
38	2 43.946	2 53.803	3 3.659	3 13.515	3 23.372	3 33.228	3 43.085	3 52.941	38	.104
39	2 44.110	2 53.967	3 3.823	3 13.680	3 23.536	3 33.393	3 43.249	3 53.106	39	.107
40	2 44.275	2 54.131	3 3.988	3 13.844	3 23.700	3 33.557	3 43.413	3 53.270	40	.110
41	2 44.439	2 54.295	3 4.152	3 14.008	3 23.865	3 33.721	3 43.578	3 53.434	41	.112
42	2 44.603	2 54.460	3 4.316	3 14.173	3 24.029	3 33.886	3 43.742	3 53.598	42	.115
43	2 44.767	2 54.624	3 4.480	3 14.337	3 24.193	3 34.050	3 43.906	3 53.763	43	.118
44	2 44.932	2 54.788	3 4.645	3 14.501	3 24.358	3 34.214	3 44.071	3 53.927	44	.120
45	2 45.096	2 54.952	3 4.809	3 14.665	3 24.522	3 34.378	3 44.235	3 54.091	45	.123
46	2 45.260	2 55.117	3 4.973	3 14.830	3 24.686	3 34.543	3 44.399	3 54.256	46	.126
47	2 45.425	2 55.281	3 5.137	3 14.994	3 24.850	3 34.707	3 44.563	3 54.420	47	.129
48	2 45.589	2 55.445	3 5.302	3 15.158	3 25.015	3 34.871	3 44.728	3 54.584	48	.131
49	2 45.753	2 55.610	3 5.466	3 15.322	3 25.179	3 35.035	3 44.892	3 54.748	49	.134
50	2 45.917	2 55.774	3 5.630	3 15.487	3 25.343	3 35.200	3 45.056	3 54.913	50	.137
51	2 46.082	2 55.938	3 5.795	3 15.651	3 25.508	3 35.364	3 45.220	3 55.077	51	.140
52	2 46.246	2 56.102	3 5.959	3 15.815	3 25.672	3 35.528	3 45.385	3 55.241	52	.142
53	2 46.410	2 56.267	3 6.123	3 15.980	3 25.836	3 35.693	3 45.549	3 55.405	53	.145
54	2 46.574	2 56.431	3 6.287	3 16.144	3 26.000	3 35.857	3 45.713	3 55.570	54	.148
55	2 46.739	2 56.595	3 6.452	3 16.308	3 26.165	3 36.021	3 45.878	3 55.734	55	.151
56	2 46.903	2 56.759	3 6.616	3 16.472	3 26.329	3 36.185	3 46.042	3 55.898	56	.153
57	2 47.067	2 56.924	3 6.780	3 16.637	3 26.493	3 36.350	3 46.206	3 56.063	57	.156
58	2 47.232	2 57.088	3 6.944	3 16.801	3 26.657	3 36.514	3 46.370	3 56.227	58	.159
59	2 47.396	2 57.252	3 7.109	3 16.965	3 26.822	3 36.678	3 46.535	3 56.391	59	0.162

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

North Latitude: 0° to 20°—March 21 to June 22.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. N.	Approx. date.	MARCH.					APRIL.										MAY.							JUNE.			Approx. date.	Lat. N.
		21	23	26	28	31	3	5	8	11	13	16	19	22	25	28	1	5	8	12	16	21	26	1	10	22		
	Dec. N.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	23° 27′	Dec. N.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
0	R.	6 04	6 03	6 02	6 01	6 00	6 00	5 59	5 58	5 57	5 57	5 56	5 55	5 55	5 54	5 53	5 53	5 53	5 52	5 52	5 52	5 52	5 53	5 54	5 55	5 57	R.	0
	S.	6 11	6 11	6 10	6 09	6 08	6 08	6 07	6 06	6 05	6 05	6 04	6 03	6 03	6 02	6 01	6 01	6 01	6 00	6 00	6 00	6 00	6 01	6 02	6 03	6 05	S.	
1	R.	6 04	6 03	6 02	6 01	6 00	6 00	5 59	5 58	5 57	5 56	5 55	5 55	5 54	5 53	5 52	5 52	5 52	5 51	5 51	5 51	5 51	5 51	5 52	5 54	5 56	R.	1
	S.	6 11	6 11	6 10	6 09	6 08	6 08	6 07	6 06	6 05	6 05	6 04	6 04	6 03	6 03	6 02	6 02	6 02	6 01	6 01	6 01	6 02	6 02	6 03	6 05	6 07	S.	
2	R.	6 04	6 03	6 02	6 01	6 00	6 00	5 59	5 58	5 57	5 56	5 55	5 54	5 53	5 52	5 51	5 51	5 51	5 50	5 50	5 50	5 49	5 50	5 51	5 52	5 54	R.	2
	S.	6 11	6 11	6 10	6 09	6 08	6 08	6 07	6 07	6 06	6 05	6 05	6 04	6 04	6 04	6 03	6 03	6 03	6 02	6 02	6 03	6 03	6 04	6 05	6 06	6 08	S.	
3	R.	6 04	6 03	6 02	6 01	6 00	5 59	5 58	5 57	5 56	5 55	5 54	5 53	5 52	5 51	5 50	5 50	5 50	5 49	5 49	5 48	5 48	5 48	5 49	5 50	5 52	R.	3
	S.	6 11	6 11	6 10	6 09	6 09	6 08	6 07	6 07	6 06	6 06	6 06	6 05	6 05	6 05	6 04	6 04	6 04	6 03	6 04	6 04	6 05	6 05	6 06	6 08	6 10	S.	
4	R.	6 04	6 03	6 02	6 01	6 00	5 59	5 58	5 57	5 56	5 55	5 54	5 53	5 52	5 50	5 49	5 49	5 49	5 48	5 47	5 47	5 46	5 47	5 48	5 49	5 51	R.	4
	S.	6 11	6 11	6 10	6 09	6 09	6 08	6 08	6 08	6 07	6 07	6 06	6 06	6 06	6 06	6 05	6 05	6 05	6 05	6 05	6 06	6 06	6 07	6 08	6 10	6 12	S.	
5	R.	6 04	6 03	6 02	6 01	6 00	5 59	5 57	5 56	5 55	5 54	5 53	5 52	5 51	5 49	5 48	5 48	5 47	5 46	5 46	5 45	5 45	5 45	5 46	5 47	5 49	R.	5
	S.	6 11	6 11	6 10	6 10	6 09	6 09	6 08	6 08	6 08	6 08	6 07	6 07	6 07	6 06	6 06	6 06	6 06	6 06	6 07	6 07	6 08	6 08	6 09	6 11	6 13	S.	
6	R.	6 03	6 02	6 01	6 01	5 59	5 58	5 57	5 55	5 54	5 53	5 52	5 51	5 50	5 49	5 47	5 47	5 46	5 45	5 45	5 44	5 43	5 44	5 45	5 46	5 47	R.	6
	S.	6 11	6 11	6 10	6 10	6 09	6 09	6 09	6 08	6 08	6 08	6 08	6 07	6 07	6 07	6 07	6 07	6 07	6 07	6 08	6 08	6 09	6 10	6 11	6 13	6 15	S.	
7	R.	6 03	6 02	6 01	6 00	5 59	5 58	5 56	5 55	5 54	5 53	5 51	5 50	5 49	5 48	5 46	5 46	5 45	5 44	5 43	5 43	5 42	5 42	5 43	5 44	5 46	R.	7
	S.	6 11	6 11	6 10	6 10	6 10	6 10	6 09	6 09	6 09	6 09	6 08	6 08	6 08	6 08	6 08	6 09	6 09	6 09	6 09	6 10	6 11	6 12	6 13	6 15	6 17	S.	
8	R.	6 03	6 02	6 01	6 00	5 58	5 57	5 56	5 54	5 53	5 52	5 50	5 49	5 48	5 47	5 45	5 45	5 44	5 43	5 42	5 41	5 40	5 40	5 41	5 42	5 44	R.	8
	S.	6 11	6 11	6 10	6 10	6 10	6 10	6 10	6 09	6 09	6 09	6 09	6 09	6 09	6 09	6 09	6 10	6 10	6 10	6 11	6 11	6 12	6 13	6 15	6 17	6 19	S.	
9	R.	6 03	6 02	6 01	6 00	5 58	5 57	5 55	5 54	5 52	5 51	5 49	5 48	5 47	5 46	5 44	5 44	5 42	5 41	5 40	5 40	5 39	5 39	5 39	5 40	5 42	R.	9
	S.	6 11	6 11	6 11	6 11	6 11	6 11	6 10	6 10	6 10	6 10	6 10	6 10	6 10	6 10	6 10	6 11	6 11	6 11	6 12	6 13	6 14	6 15	6 17	6 19	6 21	S.	
10	R.	6 03	6 02	6 01	6 00	5 58	5 57	5 55	5 53	5 52	5 51	5 49	5 48	5 47	5 45	5 43	5 43	5 41	5 40	5 39	5 38	5 37	5 37	5 37	5 38	5 40	R.	10
	S.	6 11	6 11	6 11	6 11	6 11	6 11	6 11	6 11	6 11	6 11	6 11	6 11	6 11	6 11	6 11	6 12	6 12	6 12	6 13	6 14	6 15	6 16	6 18	6 20	6 22	S.	
11	R.	6 03	6 02	6 01	5 59	5 57	5 56	5 54	5 53	5 51	5 50	5 48	5 47	5 46	5 44	5 42	5 42	5 40	5 39	5 38	5 37	5 36	5 36	5 36	5 36	5 38	R.	11
	S.	6 11	6 11	6 11	6 11	6 11	6 11	6 11	6 11	6 11	6 12	6 12	6 12	6 12	6 12	6 12	6 13	6 13	6 14	6 15	6 16	6 17	6 18	6 20	6 22	6 24	S.	
12	R.	6 03	6 02	6 01	5 59	5 57	5 56	5 54	5 52	5 51	5 49	5 47	5 46	5 45	5 43	5 41	5 41	5 39	5 38	5 37	5 36	5 34	5 34	5 34	5 35	5 36	R.	12
	S.	6 11	6 11	6 11	6 11	6 11	6 12	6 12	6 12	6 12	6 12	6 12	6 12	6 13	6 13	6 13	6 14	6 14	6 15	6 16	6 17	6 18	6 19	6 21	6 24	6 26	S.	
13	R.	6 03	6 02	6 00	5 59	5 57	5 55	5 53	5 52	5 50	5 48	5 46	5 45	5 44	5 42	5 40	5 39	5 38	5 36	5 35	5 34	5 33	5 33	5 33	5 33	5 34	R.	13
	S.	6 11	6 11	6 11	6 12	6 12	6 12	6 12	6 12	6 13	6 13	6 13	6 13	6 14	6 14	6 14	6 15	6 16	6 16	6 17	6 18	6 20	6 21	6 23	6 26	6 28	S.	
14	R.	6 03	6 02	6 00	5 59	5 57	5 55	5 53	5 51	5 49	5 48	5 46	5 44	5 43	5 41	5 39	5 38	5 37	5 35	5 34	5 33	5 32	5 31	5 31	5 31	5 32	R.	14
	S.	6 11	6 11	6 11	6 12	6 12	6 12	6 13	6 13	6 13	6 14	6 14	6 14	6 15	6 15	6 15	6 16	6 17	6 18	6 19	6 20	6 21	6 23	6 25	6 28	6 30	S.	
15	R.	6 03	6 02	6 00	5 58	5 56	5 55	5 53	5 51	5 49	5 47	5 45	5 43	5 42	5 40	5 38	5 37	5 35	5 34	5 32	5 31	5 30	5 29	5 29	5 29	5 30	R.	15
	S.	6 11	6 12	6 12	6 12	6 12	6 13	6 13	6 14	6 14	6 14	6 15	6 15	6 16	6 16	6 16	6 17	6 18	6 19	6 20	6 21	6 23	6 24	6 27	6 30	6 32	S.	
16	R.	6 03	6 02	6 00	5 58	5 56	5 54	5 52	5 50	5 48	5 47	5 45	5 43	5 41	5 39	5 37	5 36	5 34	5 32	5 30	5 29	5 28	5 28	5 28	5 28	5 28	R.	16
	S.	6 11	6 12	6 12	6 12	6 13	6 13	6 14	6 14	6 14	6 15	6 15	6 16	6 17	6 17	6 17	6 18	6 19	6 20	6 21	6 23	6 24	6 26	6 28	6 31	6 34	S.	
17	R.	6 03	6 02	6 00	5 58	5 56	5 54	5 52	5 50	5 48	5 46	5 44	5 42	5 40	5 38	5 36	5 35	5 33	5 31	5 29	5 28	5 26	5 26	5 26	5 26	5 26	R.	17
	S.	6 11	6 12	6 13	6 13	6 13	6 14	6 14	6 15	6 15	6 16	6 16	6 17	6 18	6 18	6 19	6 20	6 21	6 22	6 23	6 25	6 26	6 28	6 30	6 33	6 36	S.	
18	R.	6 03	6 02	6 00	5 58	5 55	5 54	5 51	5 49	5 47	5 45	5 43	5 41	5 39	5 37	5 35	5 34	5 32	5 30	5 28	5 26	5 25	5 24	5 24	5 24	5 24	R.	18
	S.	6 11	6 12	6 12	6 13	6 13	6 14	6 14	6 15	6 16	6 16	6 17	6 18	6 19	6 19	6 20	6 21	6 22	6 23	6 25	6 26	6 28	6 29	6 32	6 35	6 38	S.	
19	R.	6 03	6 01	5 59	5 57	5 55	5 53	5 51	5 49	5 46	5 44	5 42	5 40	5 38	5 36	5 34	5 32	5 30	5 28	5 26	5 25	5 23	5 22	5 22	5 22	5 22	R.	19
	S.	6 11	6 12	6 12	6 13	6 14	6 14	6 15	6 16	6 16	6 17	6 18	6 19	6 20	6 20	6 21	6 22	6 23	6 24	6 26	6 28	6 29	6 31	6 34	6 37	6 40	S.	
20	R.	6 03	6 01	5 59	5 57	5 55	5 53	5 50	5 48	5 46	5 44	5 41	5 39	5 37	5 35	5 33	5 31	5 29	5 27	5 25	5 23	5 22	5 21	5 20	5 20	5 20	R.	20
	S.	6 11	6 12	6 12	6 13	6 14	6 15	6 15	6 16	6 17	6 18	6 19	6 20	6 21	6 21	6 22	6 23	6 25	6 26	6 28	6 29	6 31	6 33	6 36	6 39	6 42	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

North Latitude: 21° to 40°—March 21 to June 22.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. N.	Approx. date.	MARCH.					APRIL.										MAY.							JUNE.			Approx. date.	Lat. N.
		21	23	26	28	31	3	5	8	11	13	16	19	22	25	28	1	5	8	12	16	21	26	1	10	22		
	Dec. N.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	23° 27′	Dec. N.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
21	R.	6 03	6 01	5 59	5 57	5 54	5 52	5 50	5 48	5 45	5 43	5 40	5 38	5 36	5 33	5 31	5 30	5 28	5 25	5 23	5 22	5 20	5 19	5 18	5 17	5 18	R.	21
	S.	6 11	6 12	6 13	6 14	6 14	6 15	6 16	6 17	6 18	6 19	6 20	6 21	6 22	6 22	6 23	6 25	6 26	6 27	6 29	6 31	6 33	6 35	6 38	6 41	6 44	S.	
22	R.	6 03	6 01	5 59	5 57	5 54	5 52	5 49	5 47	5 44	5 42	5 40	5 37	5 35	5 32	5 30	5 28	5 26	5 24	5 22	5 20	5 18	5 17	5 16	5 15	5 16	R.	22
	S.	6 11	6 12	6 13	6 14	6 14	6 15	6 16	6 17	6 18	6 19	6 20	6 21	6 23	6 23	6 24	6 26	6 27	6 29	6 31	6 32	6 34	6 37	6 40	6 43	6 46	S.	
23	R.	6 03	6 01	5 59	5 56	5 54	5 52	5 49	5 47	5 44	5 42	5 39	5 36	5 34	5 31	5 29	5 27	5 25	5 22	5 20	5 18	5 16	5 15	5 14	5 13	5 14	R.	23
	S.	6 11	6 12	6 13	6 14	6 15	6 16	6 17	6 18	6 19	6 20	6 21	6 22	6 24	6 25	6 26	6 27	6 29	6 30	6 32	6 34	6 36	6 39	6 42	6 45	6 48	S.	
24	R.	6 03	6 01	5 59	5 56	5 53	5 51	5 48	5 46	5 43	5 41	5 38	5 35	5 33	5 30	5 28	5 26	5 23	5 21	5 19	5 17	5 15	5 13	5 12	5 11	5 12	R.	24
	S.	6 11	6 12	6 13	6 14	6 15	6 16	6 17	6 18	6 19	6 21	6 22	6 23	6 25	6 26	6 27	6 29	6 30	6 32	6 34	6 36	6 38	6 40	6 44	6 47	6 50	S.	
25	R.	6 03	6 01	5 58	5 56	5 53	5 51	5 48	5 45	5 42	5 40	5 37	5 34	5 32	5 29	5 26	5 24	5 22	5 19	5 17	5 15	5 13	5 11	5 10	5 09	5 10	R.	25
	S.	6 11	6 12	6 13	6 15	6 16	6 17	6 18	6 19	6 20	6 22	6 23	6 24	6 26	6 27	6 28	6 30	6 32	6 33	6 36	6 38	6 40	6 42	6 46	6 50	6 53	S.	
26	R.	6 03	6 01	5 58	5 56	5 53	5 50	5 47	5 45	5 42	5 39	5 36	5 33	5 31	5 28	5 25	5 23	5 20	5 18	5 15	5 13	5 11	5 09	5 08	5 07	5 08	R.	26
	S.	6 11	6 12	6 13	6 15	6 16	6 17	6 18	6 20	6 21	6 22	6 24	6 25	6 27	6 28	6 29	6 31	6 33	6 35	6 37	6 39	6 41	6 44	6 48	6 52	6 55	S.	
27	R.	6 03	6 01	5 58	5 55	5 52	5 50	5 47	5 44	5 41	5 38	5 35	5 32	5 30	5 27	5 24	5 22	5 19	5 16	5 14	5 12	5 09	5 07	5 06	5 05	5 06	R.	27
	S.	6 11	6 13	6 14	6 15	6 16	6 18	6 19	6 20	6 22	6 23	6 25	6 26	6 28	6 29	6 31	6 33	6 35	6 36	6 39	6 41	6 43	6 46	6 50	6 54	6 58	S.	
28	R.	6 03	6 01	5 58	5 55	5 52	5 49	5 46	5 43	5 40	5 37	5 34	5 31	5 29	5 26	5 22	5 20	5 17	5 15	5 12	5 10	5 07	5 05	5 04	5 03	5 04	R.	28
	S.	6 11	6 13	6 14	6 15	6 17	6 18	6 19	6 21	6 23	6 24	6 26	6 27	6 29	6 30	6 32	6 34	6 36	6 38	6 40	6 43	6 45	6 48	6 52	6 56	7 00	S.	
29	R.	6 03	6 01	5 57	5 55	5 52	5 49	5 45	5 42	5 39	5 36	5 33	5 30	5 27	5 24	5 21	5 19	5 16	5 13	5 10	5 08	5 05	5 03	5 01	5 00	5 01	R.	29
	S.	6 11	6 13	6 14	6 16	6 17	6 19	6 20	6 22	6 24	6 25	6 27	6 28	6 30	6 32	6 34	6 36	6 38	6 40	6 42	6 45	6 47	6 50	6 54	6 58	7 02	S.	
30	R.	6 03	6 00	5 57	5 54	5 51	5 48	5 45	5 42	5 38	5 35	5 32	5 29	5 26	5 23	5 20	5 17	5 14	5 11	5 09	5 06	5 03	5 01	4 59	4 58	4 59	R.	30
	S.	6 12	6 13	6 14	6 16	6 17	6 19	6 21	6 23	6 24	6 26	6 28	6 29	6 31	6 33	6 35	6 37	6 39	6 41	6 44	6 46	6 49	6 52	6 56	7 01	7 05	S.	
31	R.	6 03	6 00	5 57	5 54	5 51	5 48	5 44	5 41	5 37	5 34	5 31	5 28	5 25	5 22	5 18	5 16	5 13	5 10	5 07	5 04	5 01	4 59	4 57	4 55	4 56	R.	31
	S.	6 12	6 13	6 15	6 17	6 18	6 20	6 21	6 23	6 25	6 27	6 29	6 31	6 33	6 35	6 37	6 39	6 41	6 43	6 46	6 48	6 51	6 55	6 59	7 03	7 07	S.	
32	R.	6 03	6 00	5 56	5 53	5 50	5 47	5 44	5 41	5 37	5 34	5 30	5 27	5 24	5 21	5 17	5 14	5 11	5 08	5 05	5 02	4 59	4 56	4 54	4 53	4 54	R.	32
	S.	6 12	6 14	6 15	6 17	6 18	6 20	6 22	6 24	6 26	6 28	6 30	6 32	6 34	6 36	6 38	6 40	6 42	6 45	6 48	6 50	6 53	6 57	7 01	7 06	7 10	S.	
33	R.	6 03	6 00	5 56	5 53	5 50	5 47	5 43	5 40	5 36	5 33	5 29	5 26	5 22	5 19	5 15	5 12	5 09	5 06	5 03	5 00	4 57	4 54	4 52	4 50	4 51	R.	33
	S.	6 12	6 14	6 15	6 17	6 19	6 21	6 23	6 25	6 27	6 29	6 31	6 33	6 35	6 37	6 39	6 42	6 44	6 47	6 50	6 53	6 56	6 59	7 04	7 08	7 12	S.	
34	R.	6 03	6 00	5 56	5 53	5 49	5 46	5 42	5 39	5 35	5 32	5 28	5 25	5 21	5 18	5 14	5 11	5 08	5 04	5 01	4 58	4 55	4 52	4 50	4 48	4 49	R.	34
	S.	6 12	6 14	6 16	6 18	6 19	6 21	6 23	6 25	6 27	6 30	6 32	6 34	6 36	6 39	6 41	6 43	6 46	6 49	6 52	6 55	6 58	7 02	7 06	7 11	7 15	S.	
35	R.	6 03	6 00	5 56	5 52	5 49	5 45	5 41	5 38	5 34	5 31	5 27	5 23	5 20	5 16	5 12	5 09	5 06	5 02	4 59	4 56	4 52	4 49	4 47	4 45	4 46	R.	35
	S.	6 12	6 14	6 16	6 18	6 20	6 22	6 24	6 26	6 28	6 31	6 33	6 35	6 38	6 40	6 42	6 45	6 48	6 51	6 54	6 57	7 00	7 04	7 09	7 13	7 18	S.	
36	R.	6 03	6 00	5 56	5 52	5 48	5 45	5 41	5 37	5 33	5 30	5 26	5 22	5 18	5 15	5 11	5 08	5 04	5 00	4 57	4 53	4 50	4 47	4 44	4 42	4 43	R.	36
	S.	6 12	6 14	6 16	6 18	6 20	6 23	6 25	6 27	6 29	6 32	6 34	6 36	6 39	6 42	6 44	6 47	6 50	6 53	6 56	6 59	7 03	7 07	7 11	7 16	7 21	S.	
37	R.	6 03	5 59	5 55	5 52	5 48	5 44	5 40	5 36	5 32	5 28	5 24	5 21	5 17	5 13	5 09	5 06	5 02	4 58	4 54	4 51	4 47	4 44	4 41	4 39	4 40	R.	37
	S.	6 12	6 14	6 16	6 19	6 21	6 24	6 26	6 28	6 30	6 33	6 35	6 38	6 41	6 43	6 46	6 49	6 52	6 55	6 58	7 02	7 05	7 09	7 14	7 19	7 24	S.	
38	R.	6 02	5 59	5 55	5 51	5 47	5 43	5 39	5 35	5 31	5 27	5 23	5 19	5 15	5 12	5 08	5 04	5 00	4 56	4 52	4 49	4 45	4 41	4 38	4 36	4 37	R.	38
	S.	6 12	6 14	6 16	6 19	6 21	6 24	6 26	6 28	6 31	6 34	6 36	6 39	6 42	6 45	6 48	6 51	6 54	6 57	7 00	7 04	7 08	7 12	7 17	7 22	7 27	S.	
39	R.	6 02	5 59	5 55	5 51	5 47	5 43	5 38	5 34	5 30	5 26	5 22	5 18	5 14	5 10	5 06	5 02	4 58	4 54	4 50	4 46	4 42	4 39	4 36	4 33	4 34	R.	39
	S.	6 12	6 15	6 17	6 20	6 22	6 25	6 27	6 29	6 32	6 35	6 38	6 41	6 44	6 47	6 50	6 53	6 56	6 59	7 03	7 06	7 10	7 15	7 20	7 25	7 30	S.	
40	R.	6 02	5 58	5 54	5 50	5 46	5 42	5 38	5 33	5 29	5 25	5 21	5 17	5 12	5 08	5 04	5 00	4 56	4 52	4 48	4 44	4 40	4 36	4 33	4 30	4 31	R.	40
	S.	6 12	6 15	6 17	6 20	6 22	6 25	6 28	6 30	6 33	6 36	6 39	6 42	6 45	6 48	6 51	6 54	6 58	7 01	7 05	7 09	7 13	7 18	7 23	7 28	7 33	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

North Latitude: 41° to 60°—March 21 to June 22.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. N.	Approx. date.	MARCH.					APRIL.										MAY.							JUNE.			Approx. date.	Lat. N.
		21	23	26	28	31	3	5	8	11	13	16	19	22	25	28	1	5	8	12	16	21	26	1	10	22		
	Dec. N.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	23° 27′	Dec. N.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
41	R.	6 02	5 58	5 54	5 50	5 46	5 41	5 37	5 32	5 28	5 24	5 19	5 15	5 11	5 07	5 02	4 58	4 54	4 49	4 45	4 41	4 37	4 33	4 30	4 27	4 27	R.	41
	S.	6 12	6 15	6 18	6 21	6 23	6 26	6 29	6 31	6 34	6 37	6 40	6 43	6 47	6 50	6 53	6 56	7 00	7 03	7 07	7 11	7 16	7 21	7 26	7 31	7 36	S.	
42	R.	6 02	5 58	5 54	5 50	5 45	5 41	5 36	5 32	5 27	5 23	5 18	5 14	5 09	5 05	5 00	4 56	4 52	4 47	4 43	4 39	4 34	4 30	4 27	4 24	4 24	R.	42
	S.	6 12	6 15	6 18	6 21	6 24	6 27	6 29	6 32	6 35	6 38	6 41	6 45	6 48	6 52	6 55	6 58	7 02	7 05	7 09	7 14	7 18	7 23	7 29	7 35	7 40	S.	
43	R.	6 02	5 58	5 53	5 49	5 44	5 40	5 35	5 31	5 26	5 22	5 17	5 12	5 08	5 03	4 58	4 54	4 49	4 45	4 40	4 36	4 31	4 27	4 23	4 20	4 20	R.	43
	S.	6 12	6 15	6 18	6 21	6 24	6 27	6 30	6 33	6 36	6 40	6 43	6 46	6 50	6 53	6 57	7 00	7 04	7 08	7 12	7 17	7 21	7 26	7 32	7 38	7 43	S.	
44	R.	6 02	5 58	5 53	5 49	5 44	5 39	5 34	5 30	5 25	5 21	5 15	5 11	5 06	5 01	4 56	4 52	4 47	4 42	4 37	4 33	4 28	4 24	4 20	4 16	4 16	R.	44
	S.	6 13	6 16	6 19	6 22	6 25	6 28	6 31	6 34	6 37	6 41	6 44	6 48	6 51	6 55	6 59	7 03	7 07	7 11	7 15	7 20	7 25	7 30	7 36	7 42	7 47	S.	
45	R.	6 02	5 57	5 52	5 48	5 43	5 38	5 33	5 28	5 24	5 19	5 14	5 09	5 04	4 59	4 54	4 49	4 44	4 39	4 34	4 30	4 25	4 20	4 16	4 12	4 12	R.	45
	S.	6 13	6 16	6 19	6 22	6 26	6 29	6 32	6 35	6 39	6 42	6 46	6 49	6 53	6 57	7 01	7 05	7 09	7 13	7 18	7 23	7 28	7 34	7 40	7 46	7 51	S.	
46	R.	6 02	5 57	5 52	5 48	5 42	5 37	5 32	5 27	5 22	5 17	5 12	5 08	5 03	4 57	4 52	4 47	4 42	4 36	4 31	4 26	4 21	4 16	4 12	4 08	4 08	R.	46
	S.	6 13	6 16	6 19	6 23	6 26	6 30	6 33	6 36	6 40	6 44	6 47	6 51	6 55	6 59	7 03	7 07	7 12	7 16	7 21	7 26	7 31	7 37	7 43	7 50	7 55	S.	
47	R.	6 02	5 57	5 52	5 47	5 42	5 37	5 31	5 26	5 21	5 16	5 10	5 06	5 01	4 55	4 50	4 45	4 39	4 34	4 28	4 23	4 18	4 13	4 08	4 04	4 04	R.	47
	S.	6 13	6 16	6 20	6 23	6 27	6 31	6 34	6 37	6 41	6 45	6 49	6 53	6 57	7 01	7 05	7 10	7 14	7 19	7 24	7 29	7 35	7 41	7 47	7 54	8 00	S.	
48	R.	6 02	5 57	5 51	5 47	5 41	5 36	5 30	5 25	5 20	5 15	5 09	5 04	4 59	4 53	4 47	4 42	4 36	4 31	4 25	4 20	4 14	4 09	4 04	4 00	3 59	R.	48
	S.	6 13	6 17	6 20	6 24	6 27	6 31	6 35	6 39	6 43	6 47	6 51	6 55	6 59	7 03	7 08	7 13	7 17	7 22	7 27	7 33	7 38	7 44	7 51	7 59	8 04	S.	
49	R.	6 01	5 56	5 51	5 46	5 40	5 35	5 29	5 24	5 18	5 13	5 07	5 02	4 56	4 51	4 45	4 39	4 33	4 27	4 22	4 16	4 11	4 05	4 00	3 55	3 55	R.	49
	S.	6 13	6 17	6 21	6 25	6 28	6 32	6 36	6 40	6 44	6 49	6 53	6 57	7 01	7 06	7 10	7 15	7 20	7 25	7 31	7 36	7 42	7 49	7 56	8 03	8 09	S.	
50	R.	6 01	5 56	5 51	5 45	5 40	5 34	5 28	5 22	5 17	5 11	5 05	5 00	4 54	4 48	4 42	4 36	4 30	4 24	4 18	4 13	4 07	4 01	3 55	3 50	3 50	R.	50
	S.	6 13	6 17	6 21	6 25	6 29	6 33	6 37	6 41	6 46	6 50	6 54	6 59	7 03	7 08	7 13	7 18	7 23	7 28	7 34	7 40	7 46	7 53	8 00	8 08	8 14	S.	
51	R.	6 01	5 56	5 50	5 45	5 39	5 33	5 27	5 21	5 15	5 09	5 03	4 58	4 52	4 46	4 39	4 33	4 27	4 21	4 15	4 09	4 02	3 56	3 51	3 45	3 44	R.	51
	S.	6 13	6 17	6 21	6 26	6 30	6 34	6 39	6 43	6 47	6 52	6 56	7 01	7 06	7 11	7 15	7 21	7 26	7 32	7 38	7 44	7 50	7 57	8 05	8 13	8 19	S.	
52	R.	6 01	5 56	5 50	5 44	5 38	5 32	5 26	5 19	5 14	5 08	5 01	4 55	4 49	4 43	4 36	4 30	4 24	4 17	4 11	4 04	3 58	3 51	3 45	3 40	3 39	R.	52
	S.	6 13	6 18	6 22	6 26	6 31	6 35	6 40	6 44	6 49	6 54	6 58	7 03	7 08	7 13	7 18	7 24	7 30	7 36	7 42	7 48	7 55	8 02	8 10	8 19	8 25	S.	
53	R.	6 01	5 55	5 49	5 43	5 37	5 31	5 24	5 18	5 12	5 06	4 59	4 53	4 47	4 40	4 33	4 27	4 20	4 13	4 07	4 00	3 53	3 46	3 40	3 34	3 33	R.	53
	S.	6 13	6 18	6 23	6 27	6 32	6 37	6 41	6 46	6 51	6 56	7 00	7 05	7 11	7 16	7 21	7 27	7 33	7 39	7 46	7 53	8 00	8 07	8 16	8 25	8 31	S.	
54	R.	6 01	5 55	5 49	5 43	5 36	5 30	5 23	5 16	5 10	5 04	4 57	4 51	4 44	4 37	4 30	4 24	4 17	4 09	4 02	3 55	3 48	3 41	3 34	3 28	3 26	R.	54
	S.	6 14	6 18	6 23	6 28	6 33	6 38	6 42	6 47	6 52	6 58	7 03	7 08	7 13	7 19	7 25	7 31	7 37	7 43	7 50	7 57	8 05	8 13	8 22	8 31	8 37	S.	
55	R.	6 01	5 55	5 48	5 42	5 35	5 29	5 22	5 15	5 08	5 02	4 55	4 48	4 41	4 34	4 27	4 20	4 13	4 05	3 58	3 50	3 43	3 35	3 28	3 21	3 19	R.	55
	S.	6 14	6 19	6 24	6 29	6 34	6 39	6 44	6 49	6 54	7 00	7 05	7 10	7 16	7 22	7 28	7 34	7 41	7 47	7 55	8 02	8 10	8 18	8 28	8 38	8 44	S.	
56	R.	6 01	5 54	5 48	5 41	5 34	5 27	5 20	5 13	5 06	4 59	4 52	4 45	4 38	4 31	4 23	4 16	4 08	4 00	3 53	3 45	3 37	3 29	3 21	3 14	3 12	R.	56
	S.	6 14	6 19	6 24	6 29	6 35	6 40	6 45	6 50	6 56	7 02	7 07	7 13	7 19	7 26	7 32	7 38	7 45	7 52	8 00	8 07	8 15	8 24	8 34	8 45	8 52	S.	
57	R.	6 00	5 54	5 47	5 40	5 33	5 26	5 19	5 11	5 04	4 57	4 49	4 42	4 35	4 27	4 19	4 12	4 04	3 56	3 48	3 39	3 31	3 22	3 14	3 06	3 04	R.	57
	S.	6 14	6 20	6 25	6 30	6 36	6 41	6 47	6 52	6 58	7 04	7 10	7 16	7 23	7 29	7 35	7 42	7 50	7 57	8 05	8 13	8 22	8 31	8 41	8 52	9 00	S.	
58	R.	6 00	5 53	5 46	5 39	5 32	5 25	5 17	5 09	5 02	4 55	4 47	4 39	4 31	4 23	4 15	4 07	3 59	3 50	3 42	3 33	3 24	3 15	3 06	2 57	2 55	R.	58
	S.	6 14	6 20	6 25	6 31	6 37	6 43	6 48	6 54	7 00	7 07	7 13	7 19	7 26	7 33	7 39	7 47	7 55	8 02	8 10	8 19	8 28	8 39	8 50	9 01	9 09	S.	
59	R.	6 00	5 53	5 45	5 38	5 30	5 23	5 15	5 07	5 00	4 52	4 44	4 36	4 28	4 20	4 11	4 02	3 54	3 45	3 36	3 27	3 17	3 07	2 58	2 48	2 45	R.	59
	S.	6 15	6 21	6 26	6 32	6 38	6 44	6 50	6 56	7 03	7 09	7 16	7 23	7 30	7 37	7 44	7 52	8 00	8 08	8 16	8 26	8 36	8 47	8 58	9 10	9 18	S.	
60	R.	6 00	5 52	5 45	5 37	5 29	5 22	5 13	5 05	4 58	4 50	4 41	4 32	4 24	4 16	4 07	3 58	3 48	3 39	3 30	3 20	3 10	3 00	2 50	2 39	2 35	R.	60
	S.	6 15	6 21	6 27	6 33	6 39	6 46	6 52	6 58	7 05	7 12	7 18	7 26	7 33	7 41	7 49	7 57	8 05	8 13	8 23	8 33	8 43	8 54	9 06	9 19	9 28	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

North Latitude: 0° to 20°—June 22 to September 23.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. N.	Approx. date.	JUNE.	JULY.					AUGUST.										SEPTEMBER.									Approx. date.	Lat. N.
		22	3	12	19	24	28	2	5	9	12	16	19	22	25	28	30	2	5	8	10	13	16	18	21	23		
	Dec. N.	23° 27′	23°	22°	21°	20°	19°	18°	17°	16°	15°	14°	13°	12°	11°	10°	9°	8°	7°	6°	5°	4°	3°	2°	1°	0°	Dec. N.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
0	R.	5 57	6 00	6 01	6 02	6 02	6 02	6 02	6 02	6 01	6 01	6 00	6 00	5 59	5 58	5 57	5 57	5 56	5 55	5 54	5 53	5 52	5 51	5 50	5 49	5 49	R.	0
	S.	6 05	6 08	6 09	6 10	6 10	6 10	6 10	6 10	6 09	6 09	6 08	6 08	6 07	6 06	6 05	6 05	6 04	6 03	6 02	6 01	6 00	5 59	5 58	5 57	5 56	S.	
1	R.	5 56	5 58	6 00	6 00	6 01	6 01	6 01	6 01	6 00	6 00	5 59	5 59	5 58	5 58	5 57	5 57	5 56	5 55	5 54	5 53	5 52	5 51	5 50	5 49	5 49	R.	1
	S.	6 07	6 09	6 11	6 11	6 12	6 11	6 11	6 11	6 10	6 10	6 09	6 08	6 07	6 07	6 06	6 05	6 04	6 03	6 02	6 01	6 00	5 59	5 58	5 57	5 56	S.	
2	R.	5 54	5 57	5 58	5 59	5 59	6 00	6 00	6 00	5 59	5 59	5 58	5 58	5 58	5 57	5 56	5 56	5 55	5 54	5 53	5 53	5 52	5 51	5 50	5 49	5 49	R.	2
	S.	6 08	6 11	6 12	6 13	6 13	6 13	6 12	6 12	6 11	6 11	6 10	6 09	6 08	6 07	6 06	6 05	6 04	6 03	6 02	6 01	6 00	5 59	5 58	5 57	5 56	S.	
3	R.	5 52	5 55	5 57	5 57	5 58	5 58	5 59	5 59	5 58	5 58	5 57	5 57	5 57	5 56	5 55	5 55	5 55	5 54	5 53	5 53	5 52	5 51	5 50	5 49	5 49	R.	3
	S.	6 10	6 13	6 14	6 14	6 15	6 14	6 14	6 13	6 12	6 12	6 11	6 10	6 09	6 08	6 07	6 06	6 05	6 04	6 03	6 02	6 01	5 59	5 58	5 57	5 56	S.	
4	R.	5 51	5 53	5 55	5 56	5 56	5 57	5 57	5 57	5 57	5 57	5 56	5 56	5 56	5 56	5 55	5 55	5 54	5 53	5 53	5 53	5 52	5 51	5 50	5 49	5 49	R.	4
	S.	6 12	6 14	6 16	6 16	6 16	6 16	6 15	6 14	6 13	6 13	6 12	6 11	6 10	6 09	6 08	6 07	6 06	6 04	6 03	6 02	6 01	5 59	5 58	5 57	5 56	S.	
5	R.	5 49	5 52	5 53	5 54	5 55	5 55	5 56	5 56	5 56	5 56	5 55	5 55	5 55	5 55	5 54	5 54	5 53	5 53	5 52	5 52	5 51	5 51	5 50	5 49	5 49	R.	5
	S.	6 13	6 16	6 17	6 17	6 18	6 17	6 17	6 16	6 15	6 14	6 13	6 12	6 11	6 10	6 09	6 08	6 06	6 05	6 03	6 02	6 01	6 00	5 59	5 57	5 56	S.	
6	R.	5 47	5 50	5 52	5 53	5 53	5 54	5 55	5 55	5 55	5 55	5 54	5 54	5 54	5 54	5 53	5 53	5 53	5 52	5 52	5 52	5 51	5 51	5 50	5 49	5 48	R.	6
	S.	6 15	6 17	6 19	6 19	6 19	6 18	6 18	6 17	6 16	6 15	6 14	6 13	6 11	6 10	6 09	6 08	6 07	6 05	6 04	6 03	6 01	6 00	5 59	5 57	5 56	S.	
7	R.	5 46	5 48	5 50	5 51	5 52	5 53	5 53	5 53	5 53	5 53	5 53	5 54	5 53	5 53	5 53	5 53	5 52	5 52	5 51	5 51	5 51	5 50	5 50	5 49	5 48	R.	7
	S.	6 17	6 19	6 21	6 21	6 21	6 20	6 19	6 18	6 17	6 16	6 15	6 14	6 12	6 11	6 10	6 09	6 07	6 06	6 04	6 03	6 02	6 00	5 59	5 57	5 56	S.	
8	R.	5 44	5 46	5 48	5 49	5 50	5 51	5 52	5 52	5 52	5 52	5 52	5 53	5 52	5 52	5 52	5 52	5 52	5 51	5 51	5 51	5 50	5 50	5 50	5 49	5 48	R.	8
	S.	6 19	6 21	6 22	6 22	6 22	6 21	6 21	6 19	6 18	6 17	6 16	6 15	6 13	6 12	6 11	6 09	6 08	6 06	6 05	6 04	6 02	6 00	5 59	5 57	5 56	S.	
9	R.	5 42	5 44	5 46	5 48	5 49	5 50	5 50	5 51	5 51	5 51	5 51	5 52	5 51	5 51	5 51	5 51	5 51	5 51	5 50	5 50	5 50	5 50	5 49	5 49	5 48	R.	9
	S.	6 21	6 23	6 24	6 24	6 24	6 23	6 22	6 21	6 20	6 18	6 17	6 16	6 14	6 13	6 12	6 10	6 09	6 07	6 05	6 04	6 03	6 01	5 59	5 58	5 56	S.	
10	R.	5 40	5 43	5 45	5 46	5 47	5 48	5 49	5 50	5 50	5 50	5 50	5 51	5 51	5 51	5 50	5 50	5 50	5 50	5 50	5 50	5 50	5 50	5 49	5 49	5 48	R.	10
	S.	6 22	6 25	6 26	6 25	6 25	6 24	6 23	6 22	6 21	6 19	6 18	6 17	6 15	6 14	6 12	6 11	6 09	6 07	6 06	6 05	6 03	6 01	5 59	5 58	5 56	S.	
11	R.	5 38	5 41	5 43	5 45	5 46	5 47	5 48	5 48	5 49	5 49	5 49	5 50	5 50	5 50	5 50	5 50	5 50	5 50	5 49	5 49	5 49	5 49	5 49	5 49	5 48	R.	11
	S.	6 24	6 27	6 27	6 27	6 27	6 26	6 25	6 23	6 22	6 20	6 19	6 18	6 16	6 15	6 13	6 12	6 10	6 08	6 06	6 05	6 03	6 01	5 59	5 58	5 56	S.	
12	R.	5 36	5 39	5 42	5 43	5 44	5 46	5 47	5 47	5 48	5 48	5 48	5 49	5 49	5 49	5 49	5 49	5 49	5 49	5 49	5 49	5 49	5 49	5 49	5 49	5 48	R.	12
	S.	6 26	6 28	6 29	6 28	6 28	6 27	6 26	6 24	6 23	6 21	6 20	6 19	6 17	6 15	6 14	6 12	6 10	6 08	6 07	6 05	6 03	6 01	5 59	5 58	5 56	S.	
13	R.	5 34	5 37	5 40	5 42	5 43	5 44	5 45	5 46	5 46	5 47	5 47	5 48	5 48	5 48	5 48	5 48	5 48	5 48	5 48	5 49	5 49	5 49	5 49	5 49	5 48	R.	13
	S.	6 28	6 30	6 31	6 30	6 30	6 28	6 27	6 26	6 24	6 23	6 21	6 20	6 18	6 16	6 15	6 13	6 11	6 09	6 07	6 06	6 04	6 02	6 00	5 58	5 56	S.	
14	R.	5 32	5 35	5 38	5 40	5 41	5 43	5 44	5 45	5 45	5 46	5 46	5 47	5 47	5 47	5 47	5 48	5 48	5 48	5 48	5 49	5 49	5 49	5 49	5 49	5 48	R.	14
	S.	6 30	6 32	6 32	6 32	6 31	6 30	6 29	6 27	6 25	6 24	6 22	6 21	6 19	6 17	6 15	6 14	6 12	6 10	6 08	6 06	6 04	6 02	6 00	5 58	5 56	S.	
15	R.	5 30	5 33	5 36	5 38	5 40	5 41	5 42	5 43	5 44	5 45	5 45	5 46	5 46	5 46	5 46	5 47	5 47	5 47	5 47	5 47	5 48	5 48	5 48	5 48	5 48	R.	15
	S.	6 32	6 34	6 34	6 33	6 33	6 31	6 30	6 28	6 27	6 25	6 23	6 22	6 20	6 18	6 16	6 14	6 12	6 10	6 08	6 06	6 04	6 02	6 00	5 58	5 56	S.	
16	R.	5 28	5 32	5 35	5 37	5 38	5 40	5 41	5 42	5 43	5 44	5 44	5 45	5 45	5 46	5 46	5 47	5 47	5 47	5 47	5 47	5 48	5 48	5 48	5 48	5 48	R.	16
	S.	6 34	6 36	6 36	6 35	6 34	6 33	6 32	6 30	6 28	6 26	6 24	6 23	6 21	6 19	6 17	6 15	6 13	6 11	6 09	6 07	6 05	6 02	6 00	5 58	5 56	S.	
17	R.	5 26	5 30	5 33	5 35	5 36	5 38	5 39	5 40	5 41	5 42	5 43	5 44	5 44	5 45	5 45	5 46	5 46	5 46	5 46	5 46	5 47	5 47	5 48	5 48	5 48	R.	17
	S.	6 36	6 38	6 38	6 37	6 36	6 35	6 33	6 31	6 29	6 27	6 26	6 24	6 22	6 20	6 18	6 16	6 14	6 11	6 09	6 07	6 05	6 03	6 00	5 58	5 56	S.	
18	R.	5 24	5 28	5 31	5 33	5 35	5 36	5 38	5 39	5 40	5 41	5 42	5 43	5 43	5 44	5 44	5 45	5 45	5 46	5 46	5 47	5 47	5 48	5 48	5 48	5 48	R.	18
	S.	6 38	6 39	6 39	6 38	6 38	6 36	6 35	6 32	6 30	6 28	6 27	6 25	6 23	6 21	6 18	6 16	6 14	6 12	6 09	6 07	6 05	6 03	6 00	5 58	5 56	S.	
19	R.	5 22	5 26	5 29	5 31	5 33	5 35	5 36	5 38	5 39	5 40	5 41	5 42	5 42	5 43	5 43	5 44	5 45	5 45	5 46	5 47	5 47	5 47	5 48	5 48	5 48	R.	19
	S.	6 40	6 41	6 41	6 40	6 39	6 38	6 36	6 34	6 32	6 30	6 28	6 26	6 24	6 22	6 19	6 17	6 15	6 12	6 10	6 08	6 06	6 03	6 01	5 58	5 56	S.	
20	R.	5 20	5 24	5 27	5 30	5 32	5 33	5 35	5 36	5 37	5 39	5 40	5 41	5 41	5 42	5 43	5 44	5 44	5 45	5 45	5 46	5 47	5 47	5 48	5 48	5 48	R.	20
	S.	6 42	6 43	6 43	6 42	6 41	6 39	6 37	6 35	6 33	6 31	6 29	6 27	6 25	6 22	6 20	6 18	6 15	6 13	6 10	6 08	6 06	6 03	6 01	5 58	5 56	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

North Latitude: 21° to 40°—June 22 to September 23.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. N.	Approx. date.	JUNE.	JULY.					AUGUST.										SEPTEMBER.									Approx. date.	Lat. N.
		22	8	12	19	24	28	2	5	9	12	16	19	22	25	28	30	1	5	8	10	13	16	18	21	23		
	Dec. N.	23° 27′	23°	22°	21°	20°	19°	18°	17°	16°	15°	14°	13°	12°	11°	10°	9°	8°	7°	6°	5°	4°	3°	2°	1°	0°	Dec. N.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
21	R.	5 18	5 22	5 25	5 28	5 30	5 32	5 33	5 35	5 36	5 37	5 38	5 39	5 40	5 41	5 42	5 43	5 43	5 44	5 45	5 46	5 46	5 47	5 47	5 48	5 48	R.	21
	S.	6 44	6 46	6 45	6 44	6 43	6 41	6 39	6 37	6 35	6 32	6 30	6 28	6 26	6 23	6 21	6 19	6 16	6 13	6 11	6 09	6 06	6 04	6 01	5 59	5 56	S.	
22	R.	5 16	5 20	5 23	5 26	5 28	5 30	5 32	5 33	5 35	5 36	5 37	5 38	5 39	5 40	5 41	5 42	5 43	5 44	5 44	5 45	5 46	5 47	5 47	5 48	5 48	R.	22
	S.	6 46	6 48	6 47	6 46	6 44	6 42	6 40	6 38	6 36	6 33	6 31	6 29	6 27	6 24	6 21	6 19	6 17	6 14	6 11	6 09	6 06	6 04	6 01	5 59	5 56	S.	
23	R.	5 14	5 18	5 21	5 24	5 26	5 28	5 30	5 32	5 33	5 35	5 36	5 37	5 38	5 39	5 40	5 42	5 42	5 43	5 44	5 45	5 46	5 46	5 47	5 48	5 48	R.	23
	S.	6 48	6 50	6 49	6 48	6 46	6 44	6 42	6 40	6 37	6 35	6 33	6 30	6 28	6 25	6 22	6 20	6 17	6 14	6 12	6 10	6 07	6 04	6 01	5 59	5 56	S.	
24	R.	5 12	5 16	5 19	5 22	5 25	5 27	5 29	5 30	5 32	5 33	5 35	5 36	5 37	5 38	5 39	5 41	5 42	5 43	5 43	5 44	5 45	5 46	5 47	5 48	5 48	R.	24
	S.	6 50	6 52	6 51	6 49	6 48	6 46	6 44	6 41	6 39	6 36	6 34	6 31	6 29	6 26	6 23	6 21	6 18	6 15	6 12	6 10	6 07	6 04	6 01	5 59	5 56	S.	
25	R.	5 10	5 13	5 17	5 20	5 23	5 25	5 27	5 29	5 30	5 32	5 33	5 35	5 36	5 37	5 38	5 40	5 41	5 42	5 43	5 44	5 45	5 46	5 47	5 48	5 48	R.	25
	S.	6 53	6 54	6 53	6 51	6 50	6 48	6 46	6 43	6 40	6 38	6 35	6 33	6 30	6 27	6 24	6 22	6 19	6 16	6 13	6 10	6 08	6 05	6 02	5 59	5 56	S.	
26	R.	5 08	5 11	5 15	5 18	5 21	5 23	5 25	5 27	5 29	5 31	5 32	5 34	5 35	5 36	5 37	5 39	5 40	5 41	5 42	5 44	5 45	5 46	5 47	5 48	5 48	R.	26
	S.	6 55	6 56	6 55	6 53	6 51	6 49	6 47	6 44	6 42	6 39	6 36	6 34	6 31	6 28	6 25	6 22	6 19	6 16	6 13	6 11	6 08	6 05	6 02	5 59	5 56	S.	
27	R.	5 06	5 09	5 13	5 16	5 19	5 22	5 24	5 26	5 27	5 29	5 31	5 33	5 34	5 35	5 36	5 38	5 39	5 41	5 42	5 43	5 44	5 45	5 46	5 47	5 48	R.	27
	S.	6 58	6 58	6 57	6 55	6 53	6 51	6 49	6 46	6 43	6 40	6 38	6 35	6 32	6 29	6 26	6 23	6 20	6 17	6 14	6 11	6 08	6 05	6 02	5 59	5 57	S.	
28	R.	5 04	5 07	5 11	5 14	5 17	5 20	5 22	5 24	5 26	5 28	5 29	5 31	5 33	5 34	5 35	5 37	5 38	5 40	5 41	5 43	5 44	5 45	5 46	5 47	5 48	R.	28
	S.	7 00	7 00	6 59	6 57	6 55	6 53	6 50	6 47	6 45	6 42	6 39	6 36	6 33	6 30	6 27	6 24	6 21	6 18	6 15	6 12	6 09	6 06	6 03	6 00	5 57	S.	
29	R.	5 01	5 05	5 09	5 12	5 15	5 18	5 20	5 22	5 24	5 26	5 28	5 30	5 31	5 33	5 34	5 36	5 37	5 39	5 40	5 42	5 44	5 45	5 46	5 47	5 48	R.	29
	S.	7 02	7 03	7 02	6 59	6 57	6 55	6 52	6 49	6 46	6 43	6 41	6 38	6 34	6 31	6 28	6 25	6 22	6 19	6 15	6 12	6 09	6 06	6 03	6 00	5 57	S.	
30	R.	4 59	5 02	5 07	5 10	5 13	5 16	5 19	5 21	5 23	5 25	5 27	5 29	5 30	5 32	5 33	5 35	5 37	5 38	5 40	5 42	5 43	5 44	5 46	5 47	5 48	R.	30
	S.	7 05	7 05	7 04	7 01	6 59	6 56	6 53	6 51	6 48	6 45	6 42	6 39	6 35	6 32	6 29	6 26	6 23	6 19	6 16	6 13	6 09	6 06	6 03	6 00	5 57	S.	
31	R.	4 56	5 00	5 04	5 08	5 11	5 14	5 17	5 19	5 21	5 23	5 25	5 27	5 29	5 31	5 32	5 34	5 36	5 38	5 39	5 41	5 43	5 44	5 45	5 47	5 48	R.	31
	S.	7 07	7 08	7 06	7 04	7 01	6 58	6 55	6 52	6 49	6 46	6 43	6 40	6 37	6 34	6 30	6 27	6 24	6 20	6 16	6 13	6 10	6 07	6 03	6 00	5 57	S.	
32	R.	4 54	4 58	5 02	5 06	5 09	5 12	5 15	5 17	5 20	5 22	5 24	5 26	5 28	5 30	5 31	5 33	5 35	5 37	5 39	5 41	5 42	5 43	5 45	5 46	5 48	R.	32
	S.	7 10	7 10	7 09	7 06	7 03	7 00	6 57	6 54	6 51	6 48	6 45	6 41	6 38	6 35	6 31	6 28	6 24	6 20	6 17	6 14	6 10	6 07	6 04	6 00	5 57	S.	
33	R.	4 51	4 55	4 59	5 03	5 07	5 10	5 13	5 15	5 18	5 20	5 22	5 24	5 26	5 28	5 30	5 32	5 34	5 36	5 38	5 40	5 42	5 43	5 45	5 46	5 48	R.	33
	S.	7 12	7 13	7 11	7 08	7 06	7 03	7 00	6 56	6 53	6 49	6 46	6 43	6 39	6 36	6 32	6 29	6 25	6 21	6 18	6 15	6 11	6 07	6 04	6 00	5 57	S.	
34	R.	4 49	4 52	4 57	5 01	5 05	5 08	5 11	5 13	5 16	5 19	5 21	5 23	5 25	5 27	5 29	5 31	5 34	5 36	5 37	5 39	5 41	5 43	5 45	5 46	5 48	R.	34
	S.	7 15	7 15	7 14	7 11	7 08	7 05	7 02	6 58	6 54	6 51	6 48	6 44	6 40	6 37	6 33	6 30	6 26	6 22	6 18	6 15	6 11	6 08	6 04	6 00	5 57	S.	
35	R.	4 46	4 50	4 54	4 58	5 02	5 06	5 09	5 11	5 14	5 17	5 19	5 22	5 24	5 26	5 28	5 30	5 33	5 35	5 37	5 39	5 41	5 42	5 44	5 46	5 48	R.	35
	S.	7 18	7 18	7 16	7 13	7 10	7 07	7 04	7 00	6 56	6 53	6 49	6 46	6 42	6 38	6 34	6 31	6 27	6 23	6 19	6 16	6 12	6 08	6 04	6 00	5 57	S.	
36	R.	4 43	4 47	4 52	4 56	5 00	5 03	5 06	5 09	5 12	5 15	5 18	5 20	5 22	5 25	5 27	5 29	5 32	5 34	5 36	5 38	5 40	5 42	5 44	5 46	5 48	R.	36
	S.	7 21	7 21	7 19	7 16	7 13	7 09	7 06	7 02	6 58	6 54	6 51	6 47	6 43	6 39	6 35	6 32	6 28	6 24	6 20	6 16	6 12	6 08	6 04	6 00	5 57	S.	
37	R.	4 40	4 44	4 49	4 53	4 57	5 01	5 04	5 07	5 10	5 13	5 16	5 19	5 21	5 24	5 26	5 28	5 31	5 33	5 35	5 37	5 40	5 42	5 44	5 46	5 48	R.	37
	S.	7 24	7 24	7 21	7 18	7 15	7 12	7 08	7 04	7 00	6 56	6 53	6 49	6 45	6 41	6 37	6 33	6 29	6 25	6 21	6 17	6 13	6 09	6 05	6 01	5 57	S.	
38	R.	4 37	4 41	4 46	4 51	4 55	4 59	5 02	5 05	5 08	5 11	5 14	5 17	5 19	5 22	5 25	5 27	5 30	5 32	5 34	5 37	5 39	5 41	5 44	5 46	5 47	R.	38
	S.	7 27	7 27	7 24	7 21	7 18	7 14	7 10	7 06	7 02	6 58	6 54	6 50	6 46	6 42	6 38	6 34	6 30	6 25	6 21	6 18	6 13	6 09	6 05	6 01	5 57	S.	
39	R.	4 34	4 38	4 43	4 48	4 52	4 56	5 00	5 03	5 06	5 09	5 12	5 15	5 18	5 21	5 23	5 26	5 29	5 31	5 33	5 36	5 39	5 41	5 43	5 45	5 47	R.	39
	S.	7 30	7 30	7 27	7 24	7 20	7 16	7 13	7 08	7 04	7 00	6 56	6 52	6 48	6 44	6 39	6 35	6 31	6 26	6 22	6 18	6 14	6 10	6 05	6 01	5 57	S.	
40	R.	4 31	4 35	4 40	4 45	4 50	4 54	4 58	5 01	5 04	5 08	5 11	5 14	5 17	5 20	5 22	5 25	5 28	5 30	5 33	5 36	5 38	5 40	5 43	5 45	5 47	R.	40
	S.	7 33	7 33	7 30	7 26	7 23	7 19	7 15	7 10	7 06	7 02	6 58	6 54	6 49	6 45	6 40	6 36	6 32	6 27	6 23	6 19	6 14	6 10	6 06	6 01	5 57	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

North Latitude: 41° to 60°—June 22 to September 23.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. N.	Approx. date.	JUNE.	JULY.					AUGUST.										SEPTEMBER.									Approx. date.	Lat. N.
		22	3	12	19	24	28	2	5	9	12	16	19	22	25	28	30	2	5	8	10	13	16	18	21	23		
	Dec. N.	23° 27′	23°	22°	21°	20°	19°	18°	17°	16°	15°	14°	13°	12°	11°	10°	9°	8°	7°	6°	5°	4°	3°	2°	1°	0°	Dec. N.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
41	R.	4 27	4 32	4 37	4 42	4 47	4 51	4 55	4 59	5 02	5 06	5 09	5 12	5 15	5 18	5 21	5 24	5 27	5 29	5 32	5 35	5 38	5 40	5 42	5 45	5 47	R.	41
	S.	7 36	7 36	7 33	7 29	7 26	7 21	7 17	7 13	7 08	7 04	7 00	6 55	6 51	6 46	6 42	6 37	6 33	6 28	6 24	6 20	6 15	6 10	6 06	6 02	5 57	S.	
42	R.	4 24	4 29	4 34	4 39	4 44	4 49	4 53	4 57	5 00	5 04	5 07	5 10	5 13	5 17	5 20	5 23	5 26	5 29	5 31	5 34	5 37	5 40	5 42	5 45	5 47	R.	42
	S.	7 40	7 39	7 36	7 32	7 28	7 24	7 20	7 15	7 10	7 06	7 02	6 57	6 52	6 48	6 43	6 38	6 34	6 29	6 24	6 20	6 16	6 11	6 06	6 02	5 57	S.	
43	R.	4 20	4 25	4 31	4 36	4 41	4 46	4 50	4 54	4 58	5 02	5 05	5 09	5 12	5 15	5 18	5 22	5 25	5 28	5 30	5 33	5 36	5 39	5 42	5 45	5 47	R.	43
	S.	7 43	7 43	7 40	7 35	7 31	7 27	7 22	7 17	7 13	7 08	7 04	6 59	6 54	6 49	6 44	6 40	6 35	6 30	6 25	6 21	6 16	6 11	6 07	6 02	5 57	S.	
44	R.	4 16	4 21	4 27	4 33	4 38	4 43	4 47	4 51	4 55	4 59	5 03	5 07	5 10	5 14	5 17	5 21	5 24	5 27	5 29	5 32	5 35	5 38	5 41	5 44	5 47	R.	44
	S.	7 47	7 47	7 44	7 39	7 34	7 30	7 25	7 20	7 15	7 10	7 06	7 01	6 56	6 51	6 46	6 41	6 36	6 31	6 26	6 22	6 17	6 12	6 07	6 02	5 58	S.	
45	R.	4 12	4 17	4 23	4 29	4 35	4 40	4 44	4 49	4 53	4 57	5 01	5 05	5 08	5 12	5 15	5 19	5 22	5 25	5 28	5 32	5 35	5 38	5 41	5 44	5 47	R.	45
	S.	7 51	7 51	7 47	7 42	7 38	7 33	7 28	7 23	7 18	7 13	7 08	7 03	6 57	6 52	6 47	6 42	6 37	6 32	6 27	6 23	6 18	6 13	6 08	6 03	5 58	S.	
46	R.	4 08	4 13	4 19	4 25	4 31	4 36	4 41	4 46	4 50	4 55	4 59	5 03	5 07	5 11	5 14	5 18	5 21	5 24	5 27	5 31	5 34	5 38	5 41	5 44	5 47	R.	46
	S.	7 55	7 55	7 51	7 46	7 41	7 36	7 31	7 26	7 20	7 15	7 10	7 05	6 59	6 54	6 49	6 44	6 38	6 33	6 28	6 23	6 18	6 13	6 08	6 03	5 58	S.	
47	R.	4 04	4 09	4 16	4 22	4 28	4 33	4 38	4 43	4 48	4 52	4 56	5 01	5 05	5 09	5 12	5 16	5 20	5 23	5 26	5 30	5 34	5 37	5 40	5 44	5 47	R.	47
	S.	8 00	7 59	7 55	7 50	7 45	7 39	7 34	7 28	7 23	7 17	7 12	7 07	7 01	6 56	6 51	6 45	6 40	6 34	6 29	6 24	6 19	6 13	6 08	6 03	5 58	S.	
48	R.	3 59	4 04	4 11	4 18	4 24	4 30	4 35	4 40	4 45	4 49	4 54	4 59	5 03	5 07	5 10	5 14	5 18	6 22	5 25	5 29	5 33	5 37	5 40	5 43	5 47	R.	48
	S.	8 04	8 03	7 59	7 53	7 48	7 43	7 37	7 31	7 26	7 20	7 15	7 09	7 03	6 58	6 59	6 47	6 41	6 36	6 30	6 25	6 19	6 14	6 09	6 03	5 58	S.	
49	R.	3 55	4 00	4 07	4 14	4 21	4 26	4 32	4 37	4 42	4 47	4 51	4 56	5 00	5 05	5 09	5 13	5 17	5 21	5 24	5 28	5 32	5 36	5 39	5 43	5 47	R.	49
	S.	8 09	8 08	8 03	7 57	7 52	7 46	7 41	7 35	7 29	7 23	7 17	7 11	7 05	7 00	6 54	6 49	6 43	6 37	6 31	6 26	6 20	6 15	6 09	6 04	5 58	S.	
50	R.	3 50	3 55	4 03	4 10	4 17	4 23	4 28	4 34	4 39	4 44	4 49	4 54	4 58	5 03	5 07	5 11	5 15	5 19	5 23	5 28	5 32	5 35	5 39	5 43	5 46	R.	50
	S.	8 14	8 13	8 08	8 02	7 56	7 50	7 44	7 38	7 32	7 26	7 20	7 14	7 07	7 02	6 56	6 50	6 44	6 38	6 32	6 27	6 21	6 15	6 09	6 04	5 58	S.	
51	R.	3 44	3 50	3 58	4 05	4 12	4 19	4 25	4 30	4 36	4 41	4 46	4 51	4 56	5 01	5 05	5 10	5 14	5 18	5 22	5 27	5 31	5 35	5 39	5 43	5 46	R.	51
	S.	8 19	8 18	8 12	8 06	8 00	7 54	7 48	7 41	7 35	7 29	7 22	7 16	7 10	7 04	6 58	6 52	6 46	6 40	6 34	6 28	6 22	6 16	6 10	6 04	5 58	S.	
52	R.	3 39	3 44	3 53	4 00	4 08	4 14	4 21	4 27	4 32	4 38	4 43	4 49	4 53	4 58	5 03	5 08	5 12	5 16	5 21	5 26	5 30	5 34	5 38	5 42	5 46	R.	52
	S.	8 25	8 23	8 18	8 11	8 05	7 58	7 52	7 45	7 38	7 32	7 25	7 19	7 12	7 06	7 00	6 54	6 47	6 41	6 35	6 29	6 23	6 16	6 10	6 04	5 58	S.	
53	R.	3 33	3 38	3 47	3 55	4 03	4 10	4 17	4 23	4 29	4 35	4 40	4 46	4 51	4 56	5 01	5 06	5 10	5 15	5 19	5 24	5 29	5 33	5 38	5 42	5 46	R.	53
	S.	8 31	8 29	8 23	8 16	8 10	8 03	7 56	7 49	7 42	7 35	7 28	7 22	7 15	7 08	7 02	6 56	6 49	6 43	6 36	6 30	6 24	6 17	6 11	6 05	5 58	S.	
54	R.	3 26	3 32	3 41	3 50	3 58	4 05	4 12	4 19	4 25	4 31	4 37	4 43	4 48	4 54	4 59	5 04	5 09	5 13	5 18	5 23	5 28	5 33	5 37	5 42	5 46	R.	54
	S.	8 37	8 35	8 29	8 22	8 15	8 07	8 00	7 53	7 45	7 38	7 31	7 25	7 18	7 11	7 04	6 58	6 51	6 44	6 37	6 31	6 25	6 18	6 11	6 05	5 59	S.	
55	R.	3 19	3 25	3 35	3 44	3 53	4 00	4 08	4 15	4 21	4 28	4 34	4 40	4 45	4 51	4 56	5 02	5 07	5 12	5 17	5 22	5 27	5 32	5 37	5 41	5 46	R.	55
	S.	8 44	8 42	8 35	8 27	8 20	8 12	8 05	7 57	7 49	7 42	7 35	7 28	7 20	7 13	7 06	7 00	6 53	6 46	6 39	6 32	6 26	6 19	6 12	6 05	5 59	S.	
56	R.	3 12	3 18	3 29	3 38	3 47	3 55	4 03	4 10	4 17	4 24	4 30	4 36	4 42	4 48	4 54	5 00	5 05	5 10	5 15	5 21	5 26	5 31	5 36	5 41	5 45	R.	56
	S.	8 52	8 49	8 42	8 33	8 25	8 17	8 10	8 02	7 54	7 46	7 38	7 31	7 23	7 16	7 09	7 02	6 55	6 47	6 40	6 34	6 27	6 19	6 12	6 06	5 59	S.	
57	R.	3 04	3 11	3 22	3 31	3 41	3 49	3 58	4 05	4 12	4 19	4 26	4 33	4 39	4 45	4 51	4 57	5 03	5 08	5 14	5 20	5 25	5 30	5 35	5 40	5 45	R.	57
	S.	9 00	8 57	8 49	8 40	8 32	8 23	8 15	8 06	7 58	7 50	7 42	7 35	7 27	7 19	7 12	7 04	6 57	6 49	6 42	6 35	6 28	6 20	6 13	6 06	5 59	S.	
58	R.	2 55	3 02	3 14	3 24	3 34	3 43	3 52	4 00	4 07	4 15	4 22	4 29	4 35	4 42	4 48	4 55	5 01	5 06	5 12	5 18	5 24	5 29	5 35	5 40	5 45	R.	58
	S.	9 09	9 06	8 57	8 48	8 38	8 29	8 20	8 12	8 03	7 55	7 46	7 38	7 30	7 22	7 14	7 07	6 59	6 51	6 43	6 36	6 29	6 21	6 14	6 07	5 59	S.	
59	R.	2 45	2 53	3 05	3 16	3 27	3 37	3 46	3 54	4 02	4 10	4 18	4 25	4 32	4 39	4 45	4 52	4 58	5 04	5 10	5 16	5 22	5 28	5 34	5 39	5 45	R.	59
	S.	9 18	9 15	9 05	8 55	8 45	8 36	8 26	8 17	8 08	8 00	7 51	7 42	7 34	7 26	7 17	7 09	7 01	6 53	6 45	6 38	6 30	6 22	6 15	6 07	6 00	S.	
60	R.	2 35	2 43	2 57	3 09	3 20	3 30	3 40	3 49	3 57	4 05	4 13	4 21	4 28	4 36	4 43	4 50	4 56	5 02	5 08	5 15	5 21	5 27	5 33	5 39	5 45	R.	60
	S.	9 28	9 25	9 13	9 03	8 53	8 43	8 33	8 23	8 14	8 04	7 55	7 46	7 37	7 29	7 20	7 12	7 03	6 55	6 47	6 39	6 31	6 23	6 15	6 08	6 00	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

North Latitude: 0° to 20°—September 23 to December 22.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. N.	Approx. date.	SEPTEMBER.			OCTOBER.												NOVEMBER.							DECEMBER.			Approx. date.	Lat. N.
		23	26	28	1	4	6	9	11	14	17	19	22	25	28	31	3	6	10	14	17	22	27	8	11	22		
	Dec. S.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	23° 27′	Dec. S.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
0	R.	5 49	5 48	5 47	5 46	5 45	5 44	5 44	5 43	5 42	5 42	5 41	5 41	5 40	5 40	5 40	5 40	5 40	5 40	5 40	5 41	5 42	5 44	5 46	5 49	5 54	R.	0
	S.	5 56	5 55	5 55	5 54	5 53	5 52	5 52	5 51	5 50	5 50	5 49	5 49	5 48	5 48	5 48	5 48	5 48	5 48	5 48	5 49	5 50	5 52	5 54	5 57	6 02	S.	
1	R.	5 49	5 48	5 47	5 46	5 46	5 45	5 44	5 43	5 43	5 43	5 42	5 42	5 41	5 41	5 41	5 41	5 41	5 41	5 42	5 43	5 44	5 45	5 47	5 51	5 56	R.	1
	S.	5 56	5 55	5 54	5 53	5 53	5 52	5 51	5 50	5 49	5 49	5 48	5 48	5 47	5 47	5 47	5 47	5 46	5 46	5 47	5 48	5 49	5 50	5 52	5 56	6 01	S.	
2	R.	5 49	5 48	5 47	5 46	5 46	5 45	5 45	5 44	5 44	5 43	5 43	5 42	5 42	5 41	5 42	5 42	5 42	5 42	5 43	5 44	5 45	5 47	5 49	5 52	5 57	R.	2
	S.	5 56	5 55	5 54	5 53	5 53	5 52	5 51	5 50	5 49	5 48	5 48	5 47	5 47	5 46	5 46	5 46	5 45	5 45	5 46	5 47	5 47	5 49	5 51	5 54	5 59	S.	
3	R.	5 49	5 48	5 47	5 46	5 46	5 45	5 45	5 44	5 44	5 44	5 43	5 43	5 43	5 42	5 43	5 43	5 43	5 43	5 44	5 45	5 47	5 48	5 50	5 54	5 59	R.	3
	S.	5 56	5 55	5 54	5 53	5 52	5 51	5 50	5 49	5 48	5 48	5 47	5 47	5 46	5 45	5 45	5 45	5 44	5 44	5 44	5 45	5 46	5 47	5 49	5 53	5 57	S.	
4	R.	5 49	5 48	5 47	5 47	5 46	5 45	5 45	5 45	5 45	5 44	5 44	5 44	5 44	5 43	5 44	5 44	5 44	5 44	5 45	5 47	5 48	5 50	5 52	5 55	6 01	R.	4
	S.	5 56	5 55	5 54	5 53	5 52	5 51	5 50	5 49	5 48	5 47	5 47	5 46	5 45	5 44	5 44	5 44	5 43	5 43	5 43	5 44	5 44	5 46	5 48	5 51	5 56	S.	
5	R.	5 49	5 48	5 47	5 47	5 47	5 46	5 46	5 45	5 45	5 45	5 45	5 45	5 45	5 44	5 45	5 45	5 46	5 46	5 47	5 48	5 50	5 51	5 54	5 57	6 03	R.	5
	S.	5 56	5 55	5 54	5 53	5 52	5 51	5 50	5 48	5 47	5 47	5 46	5 45	5 44	5 43	5 43	5 42	5 42	5 42	5 42	5 42	5 43	5 44	5 46	5 49	5 54	S.	
6	R.	5 48	5 48	5 47	5 47	5 47	5 46	5 46	5 46	5 46	5 45	5 45	5 45	5 45	5 45	5 46	5 46	5 47	5 47	5 48	5 49	5 51	5 53	5 55	5 59	6 04	R.	6
	S.	5 56	5 55	5 54	5 53	5 52	5 50	5 49	5 48	5 47	5 46	5 45	5 44	5 43	5 42	5 42	5 41	5 41	5 41	5 41	5 41	5 42	5 43	5 44	5 48	5 52	S.	
7	R.	5 48	5 48	5 48	5 47	5 47	5 47	5 47	5 46	5 46	5 46	5 46	5 46	5 46	5 46	5 47	5 47	5 48	5 48	5 49	5 51	5 52	5 54	5 57	6 01	6 06	R.	7
	S.	5 56	5 55	5 54	5 52	5 51	5 50	5 49	5 47	5 46	5 45	5 44	5 43	5 42	5 41	5 41	5 40	5 40	5 39	5 39	5 40	5 40	5 41	5 43	5 46	5 50	S.	
8	R.	5 48	5 48	5 48	5 47	5 47	5 47	5 47	5 47	5 47	5 47	5 47	5 47	5 47	5 47	5 48	5 48	5 49	5 49	5 50	5 52	5 54	5 56	5 58	6 02	6 08	R.	8
	S.	5 56	5 55	5 54	5 52	5 51	5 50	5 48	5 47	5 46	5 45	5 44	5 43	5 41	5 40	5 40	5 39	5 39	5 38	5 38	5 39	5 39	5 40	5 41	5 44	5 49	S.	
9	R.	5 48	5 48	5 48	5 48	5 48	5 47	5 47	5 47	5 48	5 48	5 48	5 48	5 48	5 48	5 49	5 49	5 50	5 51	5 52	5 53	5 55	5 57	6 00	6 04	6 10	R.	9
	S.	5 56	5 55	5 54	5 52	5 51	5 49	5 48	5 46	5 45	5 44	5 43	5 42	5 40	5 39	5 39	5 38	5 37	5 37	5 37	5 37	5 37	5 38	5 39	5 42	5 47	S.	
10	R.	5 48	5 48	5 48	5 48	5 48	5 48	5 48	5 48	5 48	5 48	5 48	5 48	5 49	5 49	5 50	5 50	5 51	5 52	5 53	5 55	5 57	5 59	6 02	6 06	6 11	R.	10
	S.	5 56	5 55	5 54	5 52	5 51	5 49	5 48	5 46	5 44	5 43	5 42	5 41	5 40	5 39	5 38	5 37	5 36	5 36	5 36	5 36	5 36	5 37	5 38	5 41	5 45	S.	
11	R.	5 48	5 48	5 48	5 48	5 48	5 48	5 48	5 48	5 49	5 49	5 49	5 49	5 50	5 50	5 51	5 51	5 52	5 53	5 54	5 56	5 58	6 00	6 03	6 08	6 13	R.	11
	S.	5 56	5 55	5 53	5 52	5 50	5 48	5 47	5 45	5 44	5 43	5 41	5 40	5 39	5 38	5 37	5 36	5 35	5 35	5 34	5 34	5 34	5 35	5 36	5 39	5 43	S.	
12	R.	5 48	5 48	5 48	5 48	5 49	5 49	5 49	5 49	5 49	5 49	5 50	5 50	5 51	5 51	5 52	5 52	5 53	5 54	5 56	5 58	6 00	6 02	6 05	6 09	6 15	R.	12
	S.	5 56	5 55	5 53	5 51	5 50	5 48	5 47	5 45	5 43	5 42	5 41	5 39	5 38	5 37	5 36	5 35	5 34	5 33	5 33	5 33	5 33	5 34	5 35	5 37	5 42	S.	
13	R.	5 48	5 48	5 49	5 49	5 49	5 49	5 49	5 49	5 50	5 50	5 51	5 51	5 52	5 52	5 53	5 54	5 55	5 56	5 57	5 59	6 01	6 04	6 07	6 11	6 17	R.	13
	S.	5 56	5 54	5 53	5 51	5 49	5 48	5 46	5 44	5 43	5 41	5 40	5 38	5 37	5 36	5 35	5 34	5 33	5 32	5 31	5 31	5 31	5 32	5 33	5 35	5 40	S.	
14	R.	5 48	5 48	5 49	5 49	5 49	5 49	5 50	5 50	5 50	5 51	5 51	5 52	5 52	5 53	5 54	5 55	5 56	5 57	5 59	6 01	6 03	6 05	6 08	6 13	6 18	R.	14
	S.	5 56	5 54	5 53	5 51	5 49	5 47	5 46	5 44	5 42	5 41	5 39	5 38	5 36	5 35	5 34	5 33	5 32	5 31	5 30	5 30	5 30	5 30	5 31	5 34	5 38	S.	
15	R.	5 48	5 48	5 49	5 49	5 50	5 50	5 50	5 50	5 51	5 51	5 52	5 52	5 53	5 54	5 55	5 56	5 57	5 58	6 00	6 02	6 04	6 07	6 10	6 15	6 20	R.	15
	S.	5 56	5 54	5 52	5 50	5 49	5 47	5 45	5 43	5 42	5 40	5 39	5 37	5 35	5 34	5 33	5 32	5 30	5 29	5 28	5 28	5 28	5 29	5 29	5 32	5 36	S.	
16	R.	5 48	5 48	5 49	5 49	5 50	5 50	5 51	5 51	5 51	5 52	5 53	5 53	5 54	5 55	5 56	5 57	5 58	6 00	6 02	6 04	6 06	6 08	6 12	6 17	6 22	R.	16
	S.	5 56	5 54	5 52	5 50	5 49	5 47	5 45	5 43	5 41	5 40	5 38	5 36	5 34	5 33	5 32	5 31	5 29	5 28	5 27	5 27	5 27	5 27	5 28	5 30	5 34	S.	
17	R.	5 48	5 48	5 49	5 49	5 50	5 50	5 51	5 51	5 52	5 53	5 53	5 54	5 55	5 56	5 57	5 58	6 00	6 01	6 03	6 05	6 08	6 10	6 14	6 19	6 24	R.	17
	S.	5 56	5 54	5 52	5 50	5 48	5 46	5 44	5 42	5 40	5 39	5 37	5 35	5 33	5 32	5 30	5 29	5 28	5 26	5 26	5 25	5 25	5 25	5 26	5 28	5 32	S.	
18	R.	5 48	5 48	5 49	5 49	5 50	5 50	5 51	5 52	5 53	5 53	5 54	5 55	5 56	5 57	5 58	5 59	6 01	6 02	6 04	6 07	6 09	6 12	6 15	6 20	6 26	R.	18
	S.	5 56	5 54	5 52	5 50	5 48	5 46	5 44	5 42	5 40	5 38	5 36	5 34	5 32	5 31	5 29	5 28	5 27	5 25	5 24	5 24	5 23	5 24	5 24	5 26	5 30	S.	
19	R.	5 48	5 48	5 49	5 50	5 51	5 51	5 52	5 52	5 53	5 54	5 55	5 56	5 57	5 58	5 59	6 01	6 02	6 04	6 06	6 08	6 11	6 14	6 17	6 22	6 28	R.	19
	S.	5 56	5 54	5 52	5 50	5 48	5 46	5 44	5 41	5 39	5 37	5 35	5 33	5 31	5 30	5 28	5 27	5 25	5 24	5 23	5 22	5 22	5 22	5 22	5 24	5 28	S.	
20	R.	5 48	5 48	5 49	5 50	5 51	5 51	5 52	5 53	5 54	5 55	5 56	5 57	5 58	5 59	6 00	6 02	6 03	6 05	6 07	6 10	6 12	6 15	6 19	6 24	6 30	R.	20
	S.	5 56	5 54	5 52	5 50	5 48	5 45	5 43	5 41	5 39	5 37	5 35	5 33	5 31	5 29	5 27	5 26	5 24	5 23	5 21	5 21	5 20	5 20	5 20	5 22	5 26	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

North Latitude: 21° to 40°—September 23 to December 22.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. N.	Approx. date.	SEPTEMBER.			OCTOBER.												NOVEMBER.							DECEMBER.			Approx. date.	Lat. N.
		23	26	28	1	4	6	9	11	14	17	19	22	25	28	31	3	6	10	14	17	22	27	3	11	22		
	Dec. S.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	23° 27′	Dec. S.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
21	R.	5 48	5 49	5 50	5 50	5 51	5 52	5 53	5 53	5 55	5 56	5 57	5 58	5 59	6 00	6 01	6 03	6 05	6 06	6 09	6 11	6 14	6 17	6 21	6 26	6 32	R.	21
	S.	5 56	5 54	5 52	5 49	5 47	5 45	5 43	5 40	5 38	5 36	5 34	5 32	5 30	5 28	5 26	5 25	5 23	5 21	5 20	5 19	5 18	5 18	5 18	5 20	5 24	S.	
22	R.	5 48	5 49	5 50	5 50	5 51	5 52	5 53	5 54	5 55	5 56	5 57	5 58	6 00	6 01	6 02	6 04	6 06	6 08	6 10	6 13	6 16	6 19	6 23	6 28	6 34	R.	22
	S.	5 56	5 54	5 52	5 49	5 47	5 45	5 42	5 40	5 37	5 35	5 33	5 31	5 29	5 27	5 25	5 24	5 22	5 20	5 18	5 18	5 17	5 17	5 17	5 18	5 22	S.	
23	R.	5 48	5 49	5 50	5 51	5 52	5 53	5 54	5 55	5 56	5 57	5 58	5 59	6 01	6 02	6 04	6 05	6 07	6 09	6 12	6 14	6 17	6 21	6 25	6 30	6 36	R.	23
	S.	5 56	5 54	5 52	5 49	5 47	5 44	5 42	5 39	5 37	5 35	5 32	5 30	5 28	5 26	5 24	5 22	5 20	5 18	5 17	5 16	5 15	5 15	5 15	5 16	5 20	S.	
24	R.	5 48	5 49	5 50	5 51	5 52	5 53	5 54	5 55	5 56	5 57	5 59	6 00	6 02	6 03	6 05	6 07	6 09	6 11	6 13	6 16	6 19	6 22	6 27	6 32	6 38	R.	24
	S.	5 56	5 54	5 52	5 49	5 46	5 44	5 41	5 39	5 36	5 34	5 32	5 29	5 27	5 25	5 23	5 21	5 19	5 17	5 15	5 15	5 14	5 13	5 13	5 14	5 18	S.	
25	R.	5 48	5 49	5 50	5 51	5 52	5 53	5 55	5 56	5 57	5 58	6 00	6 01	6 03	6 04	6 06	6 08	6 10	6 12	6 15	6 18	6 21	6 24	6 29	6 34	6 40	R.	25
	S.	5 56	5 54	5 51	5 48	5 46	5 43	5 41	5 38	5 35	5 33	5 31	5 28	5 26	5 23	5 21	5 19	5 17	5 15	5 14	5 13	5 12	5 11	5 11	5 12	5 16	S.	
26	R.	5 48	5 49	5 50	5 51	5 53	5 54	5 55	5 56	5 58	5 59	6 00	6 02	6 04	6 05	6 07	6 09	6 11	6 13	6 16	6 19	6 22	6 26	6 31	6 36	6 42	R.	26
	S.	5 56	5 54	5 51	5 48	5 46	5 43	5 40	5 37	5 35	5 33	5 30	5 28	5 25	5 22	5 20	5 18	5 16	5 14	5 12	5 11	5 10	5 09	5 09	5 10	5 14	S.	
27	R.	5 48	5 49	5 50	5 51	5 53	5 54	5 56	5 57	5 58	6 00	6 01	6 03	6 05	6 06	6 08	6 10	6 13	6 15	6 18	6 21	6 24	6 28	6 33	6 39	6 45	R.	27
	S.	5 57	5 54	5 51	5 48	5 45	5 42	5 40	5 37	5 34	5 32	5 29	5 27	5 24	5 21	5 19	5 17	5 15	5 13	5 11	5 10	5 08	5 07	5 07	5 08	5 12	S.	
28	R.	5 48	5 49	5 51	5 52	5 53	5 54	5 56	5 57	5 59	6 00	6 02	6 04	6 06	6 07	6 09	6 12	6 14	6 16	6 19	6 23	6 26	6 30	6 35	6 41	6 47	R.	28
	S.	5 57	5 54	5 51	5 48	5 45	5 42	5 39	5 36	5 34	5 31	5 28	5 26	5 23	5 20	5 18	5 16	5 13	5 11	5 09	5 08	5 06	5 05	5 05	5 06	5 10	S.	
29	R.	5 48	5 49	5 51	5 52	5 54	5 55	5 57	5 58	6 00	6 01	6 03	6 05	6 07	6 09	6 11	6 13	6 16	6 18	6 21	6 25	6 28	6 32	6 37	6 43	6 49	R.	29
	S.	5 57	5 54	5 51	5 48	5 45	5 42	5 39	5 36	5 33	5 30	5 27	5 25	5 22	5 19	5 17	5 14	5 12	5 09	5 07	5 06	5 04	5 03	5 03	5 04	5 07	S.	
30	R.	5 48	5 49	5 51	5 52	5 54	5 55	5 57	5 58	6 00	6 02	6 04	6 06	6 08	6 10	6 12	6 15	6 17	6 20	6 23	6 26	6 30	6 34	6 39	6 45	6 51	R.	30
	S.	5 57	5 54	5 51	5 48	5 45	5 41	5 38	5 35	5 32	5 30	5 27	5 24	5 21	5 18	5 15	5 13	5 10	5 08	5 06	5 04	5 02	5 01	5 01	5 02	5 05	S.	
31	R.	5 48	5 49	5 51	5 52	5 54	5 56	5 58	5 59	6 01	6 03	6 05	6 07	6 09	6 11	6 14	6 16	6 19	6 21	6 24	6 28	6 32	6 36	6 41	6 47	6 54	R.	31
	S.	5 57	5 54	5 51	5 47	5 44	5 41	5 38	5 34	5 31	5 29	5 26	5 23	5 20	5 17	5 14	5 11	5 09	5 06	5 04	5 02	5 00	4 59	4 58	4 59	5 03	S.	
32	R.	5 48	5 49	5 51	5 52	5 54	5 56	5 58	6 00	6 02	6 04	6 06	6 08	6 10	6 12	6 15	6 17	6 20	6 23	6 26	6 30	6 34	6 38	6 43	6 50	6 56	R.	32
	S.	5 57	5 54	5 51	5 47	5 43	5 40	5 37	5 34	5 31	5 28	5 25	5 22	5 19	5 16	5 13	5 10	5 07	5 05	5 02	5 00	4 58	4 57	4 56	4 57	5 00	S.	
33	R.	5 48	5 49	5 51	5 53	5 55	5 57	5 59	6 01	6 03	6 05	6 07	6 09	6 11	6 13	6 16	6 19	6 22	6 25	6 28	6 32	6 36	6 41	6 46	6 52	6 59	R.	33
	S.	5 57	5 53	5 50	5 47	5 43	5 40	5 37	5 33	5 30	5 27	5 24	5 21	5 17	5 14	5 11	5 09	5 06	5 03	5 00	4 58	4 56	4 55	4 54	4 54	4 58	S.	
34	R.	5 48	5 49	5 51	5 53	5 55	5 57	5 59	6 01	6 03	6 05	6 08	6 10	6 12	6 15	6 18	6 20	6 23	6 26	6 30	6 34	6 38	6 43	6 48	6 55	7 01	R.	34
	S.	5 57	5 53	5 50	5 47	5 43	5 39	5 36	5 33	5 29	5 26	5 23	5 20	5 16	5 13	5 10	5 07	5 04	5 01	4 59	4 57	4 54	4 53	4 52	4 52	4 55	S.	
35	R.	5 48	5 50	5 52	5 53	5 55	5 58	6 00	6 02	6 04	6 06	6 09	6 11	6 14	6 16	6 19	6 22	6 25	6 28	6 32	6 36	6 40	6 45	6 50	6 57	7 04	R.	35
	S.	5 57	5 53	5 50	5 46	5 42	5 39	5 36	5 32	5 28	5 25	5 22	5 18	5 15	5 11	5 08	5 05	5 02	4 59	4 57	4 55	4 52	4 51	4 49	4 49	4 53	S.	
36	R.	5 48	5 50	5 52	5 54	5 56	5 58	6 00	6 02	6 05	6 07	6 10	6 12	6 15	6 17	6 21	6 24	6 27	6 30	6 34	6 38	6 42	6 47	6 53	7 00	7 06	R.	36
	S.	5 57	5 53	5 50	5 46	5 42	5 38	5 35	5 31	5 28	5 24	5 21	5 17	5 14	5 10	5 07	5 04	5 01	4 58	4 55	4 53	4 50	4 48	4 47	4 47	4 50	S.	
37	R.	5 48	5 50	5 52	5 54	5 56	5 59	6 01	6 03	6 06	6 08	6 11	6 13	6 16	6 19	6 22	6 25	6 29	6 32	6 36	6 40	6 45	6 50	6 55	7 02	7 09	R.	37
	S.	5 57	5 53	5 49	5 45	5 41	5 38	5 34	5 30	5 27	5 23	5 20	5 16	5 12	5 09	5 05	5 02	4 59	4 56	4 53	4 50	4 48	4 46	4 44	4 44	4 47	S.	
38	R.	5 47	5 50	5 52	5 54	5 56	5 59	6 02	6 04	6 06	6 09	6 12	6 14	6 17	6 20	6 24	6 27	6 30	6 34	6 38	6 42	6 47	6 52	6 58	7 05	7 12	R.	38
	S.	5 57	5 53	5 49	5 45	5 41	5 37	5 34	5 30	5 26	5 22	5 19	5 15	5 11	5 07	5 04	5 01	4 57	4 54	4 51	4 48	4 45	4 43	4 42	4 41	4 44	S.	
39	R.	5 47	5 50	5 52	5 54	5 57	6 00	6 02	6 05	6 07	6 10	6 13	6 16	6 19	6 22	6 25	6 29	6 32	6 36	6 40	6 45	6 50	6 55	7 01	7 08	7 15	R.	39
	S.	5 57	5 53	5 49	5 45	5 41	5 37	5 33	5 29	5 25	5 21	5 18	5 14	5 10	5 06	5 02	4 59	4 55	4 52	4 48	4 46	4 43	4 41	4 39	4 38	4 41	S.	
40	R.	5 47	5 50	5 52	5 55	5 57	6 00	6 03	6 06	6 08	6 11	6 14	6 17	6 20	6 23	6 27	6 30	6 34	6 38	6 42	6 47	6 52	6 57	7 03	7 11	7 18	R.	40
	S.	5 57	5 53	5 49	5 45	5 40	5 36	5 32	5 28	5 24	5 20	5 17	5 13	5 08	5 04	5 01	4 57	4 53	4 50	4 46	4 43	4 40	4 38	4 36	4 35	4 38	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

North Latitude: 41° to 60°—September 23 to December 22.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. N.	Approx. date.	SEPTEMBER.			OCTOBER.												NOVEMBER.							DECEMBER.			Approx. date.	Lat. N.
		23	26	28	1	4	6	9	11	14	17	19	22	25	28	31	3	6	10	14	17	22	27	8	11	22		
	Dec. S.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	23° 27′	Dec. S.	
°		h. m.	h. m.	h. m.	h. m.	h. m	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
41	R.	5 47	5 50	5 53	5 55	5 58	6 01	6 04	6 06	6 09	6 12	6 15	6 18	6 22	6 25	6 29	6 32	6 36	6 40	6 45	6 50	6 55	7 00	7 06	7 14	7 21	R.	41
	S.	5 57	5 53	5 49	5 44	5 40	5 36	5 32	5 27	5 23	5 19	5 15	5 11	5 07	5 03	4 59	4 55	4 51	4 47	4 44	4 41	4 38	4 35	4 33	4 32	4 35	S.	
42	R.	5 47	5 50	5 53	5 55	5 58	6 01	6 04	6 07	6 10	6 13	6 16	6 20	6 23	6 26	6 30	6 34	6 38	6 42	6 47	6 52	6 57	7 03	7 09	7 17	7 24	R.	42
	S.	5 57	5 53	5 49	5 44	5 39	5 35	5 31	5 27	5 22	5 18	5 14	5 10	5 05	5 01	4 57	4 53	4 49	4 45	4 42	4 39	4 35	4 33	4 30	4 29	4 32	S.	
43	R.	5 47	5 50	5 53	5 56	5 59	6 02	6 05	6 08	6 11	6 14	6 18	6 21	6 25	6 28	6 32	6 36	6 40	6 44	6 49	6 54	7 00	7 06	7 12	7 20	7 28	R.	43
	S.	5 57	5 53	5 48	5 44	5 39	5 35	5 30	5 26	5 21	5 17	5 13	5 08	5 04	4 59	4 55	4 51	4 47	4 43	4 39	4 36	4 33	4 30	4 27	4 26	4 29	S.	
44	R.	5 47	5 50	5 53	5 56	5 59	6 02	6 06	6 09	6 12	6 16	6 19	6 23	6 26	6 30	6 34	6 38	6 42	6 47	6 52	6 57	7 03	7 09	7 15	7 24	7 31	R.	44
	S.	5 58	5 53	5 48	5 44	5 39	5 34	5 30	5 25	5 20	5 16	5 11	5 07	5 02	4 58	4 54	4 49	4 45	4 41	4 37	4 33	4 30	4 27	4 24	4 23	4 25	S.	
45	R.	5 47	5 50	5 53	5 56	5 59	6 03	6 06	6 09	6 13	6 17	6 20	6 24	6 28	6 31	6 36	6 40	6 45	6 49	6 54	7 00	7 06	7 12	7 19	7 27	7 35	R.	45
	S.	5 58	5 53	5 48	5 43	5 38	5 34	5 29	5 24	5 19	5 15	5 10	5 05	5 01	4 56	4 52	4 47	4 43	4 38	4 34	4 31	4 27	4 24	4 21	4 19	4 22	S.	
46	R.	5 47	5 50	5 53	5 56	6 00	6 03	6 07	6 10	6 14	6 18	6 22	6 26	6 29	6 33	6 38	6 42	6 47	6 52	6 57	7 03	7 09	7 15	7 22	7 31	7 38	R.	46
	S.	5 58	5 53	5 48	5 43	5 38	5 33	5 28	5 23	5 18	5 14	5 09	5 04	4 59	4 54	4 50	4 45	4 41	4 36	4 32	4 28	4 24	4 20	4 17	4 16	4 18	S.	
47	R.	5 47	5 50	5 54	5 57	6 01	6 04	6 08	6 11	6 15	6 19	6 23	6 27	6 31	6 35	6 40	6 44	6 49	6 54	7 00	7 06	7 12	7 19	7 26	7 35	7 42	R.	47
	S.	5 58	5 53	5 48	5 43	5 38	5 33	5 28	5 22	5 17	5 12	5 07	5 02	4 57	4 53	4 48	4 43	4 38	4 33	4 29	4 25	4 21	4 17	4 14	4 12	4 14	S.	
48	R.	5 47	5 50	5 54	5 57	6 01	6 05	6 09	6 12	6 16	6 20	6 25	6 29	6 33	6 37	6 42	6 47	6 52	6 57	7 03	7 09	7 15	7 22	7 30	7 39	7 46	R.	48
	S.	5 58	5 53	5 48	5 42	5 37	5 32	5 27	5 21	5 16	5 11	5 06	5 01	4 56	4 51	4 46	4 41	4 36	4 31	4 26	4 22	4 17	4 13	4 10	4 08	4 10	S.	
49	R.	5 47	5 50	5 54	5 58	6 02	6 05	6 09	6 13	6 18	6 22	6 26	6 30	6 35	6 39	6 44	6 49	6 55	7 00	7 06	7 12	7 19	7 26	7 34	7 43	7 51	R.	49
	S.	5 58	5 53	5 48	5 42	5 37	5 31	5 26	5 20	5 15	5 10	5 04	4 59	4 54	4 49	4 43	4 38	4 33	4 28	4 23	4 18	4 14	4 10	4 06	4 04	4 06	S.	
50	R.	5 46	5 50	5 54	5 58	6 02	6 06	6 10	6 14	6 19	6 23	6 28	6 32	6 37	6 41	6 47	6 52	6 57	7 03	7 09	7 16	7 23	7 30	7 38	7 47	7 55	R.	50
	S.	5 58	5 53	5 47	5 41	5 36	5 30	5 25	5 19	5 14	5 08	5 03	4 57	4 52	4 46	4 41	4 36	4 30	4 25	4 20	4 15	4 10	4 06	4 02	3 59	4 01	S.	
51	R.	5 46	5 50	5 55	5 59	6 03	6 07	6 11	6 16	6 20	6 25	6 29	6 34	6 39	6 44	6 49	6 55	7 00	7 06	7 12	7 19	7 26	7 34	7 42	7 52	8 00	R.	51
	S.	5 58	5 52	5 47	5 41	5 35	5 29	5 24	5 18	5 12	5 07	5 01	4 56	4 50	4 44	4 38	4 33	4 27	4 22	4 16	4 11	4 06	4 02	3 57	3 55	3 56	S.	
52	R.	5 46	5 50	5 55	5 59	6 04	6 08	6 12	6 17	6 21	6 26	6 31	6 36	6 41	6 46	6 52	6 57	7 03	7 09	7 16	7 23	7 30	7 38	7 47	7 57	8 05	R.	52
	S.	5 58	5 52	5 47	5 41	5 35	5 29	5 23	5 17	5 11	5 05	5 00	4 54	4 48	4 42	4 36	4 30	4 24	4 18	4 13	4 08	4 02	3 57	3 53	3 50	3 51	S.	
53	R.	5 46	5 50	5 55	5 59	6 04	6 09	6 13	6 18	6 23	6 28	6 33	6 38	6 43	6 48	6 54	7 00	7 06	7 13	7 19	7 27	7 35	7 43	7 52	8 02	8 11	R.	53
	S.	5 58	5 52	5 46	5 40	5 34	5 28	5 22	5 16	5 10	5 04	4 58	4 52	4 45	4 39	4 33	4 27	4 21	4 15	4 09	4 04	3 58	3 53	3 48	3 44	3 46	S.	
54	R.	5 46	5 50	5 55	6 00	6 05	6 09	6 14	6 19	6 24	6 29	6 35	6 40	6 45	6 51	6 57	7 03	7 10	7 16	7 23	7 31	7 39	7 48	7 57	8 08	8 16	R.	54
	S.	5 59	5 52	5 46	5 40	5 34	5 27	5 21	5 15	5 08	5 02	4 56	4 50	4 43	4 37	4 30	4 24	4 18	4 11	4 05	4 00	3 54	3 48	3 43	3 39	3 40	S.	
55	R.	5 46	5 50	5 55	6 00	6 05	6 10	6 15	6 20	6 26	6 31	6 37	6 42	6 48	6 54	7 00	7 07	7 13	7 20	7 27	7 35	7 44	7 53	8 02	8 13	8 22	R.	55
	S.	5 59	5 52	5 46	5 39	5 33	5 26	5 20	5 13	5 07	5 00	4 54	4 47	4 41	4 34	4 27	4 21	4 14	4 08	4 01	3 55	3 49	3 43	3 37	3 33	3 34	S.	
56	R.	5 45	5 50	5 56	6 01	6 06	6 11	6 17	6 22	6 27	6 33	6 39	6 45	6 51	6 57	7 03	7 10	7 17	7 24	7 32	7 40	7 49	7 58	8 08	8 20	8 29	R.	56
	S.	5 59	5 52	5 46	5 39	5 32	5 25	5 19	5 12	5 05	4 58	4 52	4 45	4 38	4 31	4 24	4 17	4 11	4 04	3 57	3 50	3 44	3 37	3 31	3 27	3 27	S.	
57	R.	5 45	5 50	5 56	6 01	6 06	6 12	6 18	6 23	6 29	6 35	6 41	6 47	6 53	7 00	7 07	7 14	7 21	7 28	7 36	7 45	7 54	8 04	8 14	8 27	8 36	R.	57
	S.	5 59	5 52	5 45	5 38	5 31	5 24	5 17	5 10	5 03	4 56	4 49	4 42	4 35	4 28	4 21	4 14	4 07	3 59	3 52	3 45	3 38	3 31	3 25	3 20	3 20	S.	
58	R.	5 45	5 50	5 56	6 02	6 07	6 13	6 19	6 25	6 31	6 37	6 43	6 50	6 56	7 03	7 10	7 17	7 25	7 33	7 41	7 50	8 00	8 10	8 21	8 34	8 44	R.	58
	S.	5 59	5 52	5 45	5 38	5 31	5 23	5 16	5 09	5 02	4 54	4 47	4 40	4 32	4 25	4 17	4 10	4 03	3 55	3 47	3 40	3 33	3 25	3 18	3 18	3 13	S.	
59	R.	5 45	5 51	5 57	6 02	6 08	6 14	6 21	6 27	6 33	6 39	6 46	6 52	6 59	7 06	7 14	7 21	7 29	7 38	7 47	7 56	8 06	8 17	8 28	8 42	8 52	R.	59
	S.	6 00	5 52	5 45	5 37	5 30	5 22	5 15	5 07	5 00	4 52	4 45	4 37	4 29	4 21	4 14	4 06	3 58	3 50	3 42	3 35	3 27	3 19	3 11	3 05	3 05	S.	
60	R.	5 45	5 51	5 57	6 03	6 09	6 16	6 22	6 28	6 35	6 42	6 48	6 55	7 02	7 10	7 18	7 26	7 34	7 43	7 52	8 02	8 13	8 24	8 36	8 51	9 01	R.	60
	S.	6 00	5 52	5 44	5 36	5 29	5 21	5 13	5 05	4 58	4 50	4 42	4 34	4 26	4 18	4 10	4 02	3 53	3 45	3 36	3 28	3 20	3 12	3 03	2 56	2 56	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

North Latitude: 0° to 20°—December 22 to March 21.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. N.	Approx. date.	DECEMBER.	JANUARY.						FEBRUARY.									MARCH.									Approx. date.	Lat. N.
		22	2	10	16	21	25	29	2	5	9	12	15	18	20	23	26	1	3	6	8	11	13	16	18	21		
	Dec. S.	23° 27′	23°	22°	21°	20°	19°	18°	17°	16°	15°	14°	13°	12°	11°	10°	9°	8°	7°	6°	5°	4°	3°	2°	1°	0°	Dec. S.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
0	R.	5 54	6 00	6 04	6 06	6 07	6 08	6 09	6 10	6 10	6 10	6 10	6 10	6 10	6 10	6 10	6 09	6 09	6 08	6 08	6 07	6 06	6 06	6 05	6 04	6 04	R.	0
	S.	6 02	6 08	6 12	6 14	6 15	6 16	6 17	6 18	6 18	6 18	6 18	6 18	6 18	6 18	6 18	6 17	6 17	6 16	6 16	6 15	6 14	6 14	6 13	6 12	6 11	S.	
1	R.	5 56	6 01	6 05	6 07	6 09	6 10	6 11	6 11	6 12	6 11	6 11	6 11	6 11	6 11	6 11	6 10	6 10	6 09	6 08	6 08	6 07	6 06	6 05	6 05	6 04	R.	1
	S.	6 01	6 06	6 10	6 12	6 14	6 15	6 16	6 16	6 17	6 17	6 17	6 17	6 17	6 17	6 17	6 16	6 16	6 16	6 15	6 15	6 14	6 13	6 12	6 12	6 11	S.	
2	R.	5 57	6 03	6 07	6 09	6 10	6 11	6 12	6 12	6 13	6 12	6 12	6 12	6 12	6 11	6 11	6 11	6 10	6 09	6 09	6 08	6 07	6 06	6 05	6 05	6 04	R.	2
	S.	5 59	6 05	6 09	6 11	6 12	6 14	6 15	6 15	6 16	6 16	6 16	6 17	6 17	6 16	6 16	6 16	6 15	6 15	6 15	6 15	6 14	6 13	6 12	6 12	6 11	S.	
3	R.	5 59	6 04	6 08	6 10	6 12	6 12	6 13	6 13	6 14	6 13	6 13	6 13	6 13	6 12	6 12	6 11	6 11	6 10	6 09	6 08	6 07	6 06	6 05	6 05	6 04	R.	3
	S.	5 57	6 03	6 07	6 09	6 11	6 12	6 13	6 14	6 15	6 15	6 15	6 16	6 16	6 16	6 16	6 15	6 15	6 15	6 14	6 14	6 13	6 13	6 12	6 12	6 11	S.	
4	R.	6 01	6 06	6 10	6 12	6 13	6 14	6 14	6 14	6 15	6 14	6 14	6 14	6 14	6 13	6 12	6 12	6 11	6 10	6 09	6 08	6 07	6 07	6 06	6 05	6 04	R.	4
	S.	5 56	6 02	6 06	6 08	6 09	6 11	6 12	6 13	6 14	6 14	6 14	6 15	6 15	6 15	6 15	6 15	6 14	6 14	6 14	6 14	6 13	6 13	6 12	6 12	6 11	S.	
5	R.	6 03	6 08	6 12	6 13	6 14	6 15	6 16	6 16	6 16	6 16	6 15	6 15	6 15	6 14	6 13	6 12	6 12	6 11	6 10	6 09	6 08	6 07	6 06	6 05	6 04	R.	5
	S.	5 54	6 00	6 04	6 06	6 08	6 09	6 11	6 12	6 12	6 13	6 13	6 14	6 14	6 14	6 14	6 14	6 14	6 14	6 14	6 14	6 13	6 13	6 12	6 12	6 11	S.	
6	R.	6 04	6 09	6 13	6 15	6 16	6 16	6 17	6 17	6 17	6 17	6 16	6 16	6 15	6 14	6 14	6 13	6 12	6 11	6 10	6 09	6 08	6 07	6 06	6 05	6 03	R.	6
	S.	5 52	5 58	6 02	6 05	6 07	6 08	6 10	6 11	6 11	6 12	6 12	6 13	6 13	6 13	6 14	6 14	6 13	6 13	6 13	6 13	6 13	6 13	6 12	6 12	6 11	S.	
7	R.	6 06	6 11	6 15	6 16	6 17	6 18	6 18	6 18	6 18	6 18	6 17	6 17	6 16	6 15	6 15	6 14	6 13	6 12	6 11	6 10	6 08	6 07	6 06	6 05	6 03	R.	7
	S.	5 50	5 56	6 01	6 03	6 05	6 07	6 08	6 09	6 10	6 11	6 11	6 12	6 12	6 12	6 13	6 13	6 13	6 13	6 13	6 13	6 12	6 12	6 12	6 12	6 11	S.	
8	R.	6 08	6 13	6 16	6 18	6 19	6 19	6 19	6 19	6 19	6 19	6 18	6 18	6 17	6 16	6 15	6 14	6 13	6 12	6 11	6 10	6 08	6 07	6 06	6 05	6 03	R.	8
	S.	5 49	5 55	5 59	6 02	6 04	6 06	6 07	6 08	6 09	6 10	6 10	6 11	6 11	6 12	6 12	6 12	6 12	6 12	6 13	6 13	6 12	6 12	6 12	6 12	6 11	S.	
9	R.	6 10	6 15	6 18	6 19	6 20	6 20	6 21	6 21	6 21	6 20	6 19	6 19	6 18	6 17	6 16	6 15	6 14	6 13	6 11	6 10	6 09	6 07	6 06	6 05	6 03	R.	9
	S.	5 47	5 53	5 57	6 00	6 02	6 04	6 06	6 07	6 08	6 09	6 09	6 10	6 10	6 11	6 11	6 11	6 11	6 12	6 12	6 12	6 12	6 12	6 12	6 12	6 11	S.	
10	R.	6 11	6 16	6 20	6 21	6 22	6 22	6 22	6 22	6 22	6 21	6 20	6 19	6 19	6 18	6 17	6 16	6 15	6 13	6 12	6 11	6 09	6 07	6 06	6 05	6 03	R.	10
	S.	5 45	5 51	5 56	5 59	6 01	6 03	6 05	6 06	6 07	6 08	6 08	6 09	6 10	6 10	6 11	6 11	6 11	6 11	6 12	6 12	6 12	6 12	6 12	6 12	6 11	S.	
11	R.	6 13	6 18	6 21	6 22	6 23	6 23	6 23	6 23	6 23	6 22	6 21	6 20	6 20	6 19	6 18	6 16	6 15	6 14	6 12	6 11	6 09	6 08	6 06	6 05	6 03	R.	11
	S.	5 43	5 49	5 54	5 57	5 59	6 01	6 03	6 05	6 06	6 07	6 07	6 08	6 09	6 09	6 10	6 10	6 10	6 11	6 11	6 11	6 11	6 12	6 12	6 12	6 11	S.	
12	R.	6 15	6 20	6 23	6 24	6 25	6 25	6 25	6 24	6 24	6 23	6 22	6 21	6 21	6 19	6 18	6 17	6 16	6 14	6 13	6 11	6 10	6 08	6 06	6 05	6 03	R.	12
	S.	5 42	5 48	5 53	5 56	5 58	6 00	6 02	6 03	6 05	6 06	6 06	6 07	6 08	6 08	6 09	6 10	6 10	6 10	6 11	6 11	6 11	6 11	6 11	6 12	6 11	S.	
13	R.	6 17	6 22	6 25	6 26	6 26	6 26	6 26	6 26	6 25	6 24	6 23	6 22	6 22	6 20	6 19	6 18	6 16	6 15	6 13	6 12	6 10	6 09	6 07	6 05	6 03	R.	13
	S.	5 40	5 46	5 51	5 54	5 56	5 58	6 00	6 02	6 03	6 04	6 05	6 06	6 07	6 07	6 08	6 09	6 09	6 10	6 10	6 11	6 11	6 11	6 11	6 11	6 11	S.	
14	R.	6 18	6 23	6 26	6 27	6 28	6 28	6 28	6 27	6 26	6 25	6 24	6 23	6 22	6 21	6 20	6 18	6 17	6 15	6 14	6 12	6 10	6 09	6 07	6 05	6 03	R.	14
	S.	5 38	5 44	5 49	5 52	5 55	5 57	5 59	6 01	6 02	6 03	6 04	6 05	6 06	6 07	6 08	6 08	6 09	6 09	6 10	6 10	6 10	6 11	6 11	6 11	6 11	S.	
15	R.	6 20	6 25	6 28	6 29	6 29	6 29	6 29	6 28	6 28	6 26	6 25	6 24	6 23	6 21	6 20	6 19	6 17	6 16	6 14	6 13	6 11	6 09	6 07	6 05	6 03	R.	15
	S.	5 36	5 42	5 47	5 51	5 53	5 55	5 57	5 59	6 01	6 02	6 03	6 04	6 05	6 06	6 07	6 08	6 08	6 09	6 09	6 10	6 10	6 10	6 11	6 11	6 11	S.	
16	R.	6 22	6 27	6 30	6 30	6 31	6 31	6 30	6 30	6 29	6 27	6 26	6 25	6 24	6 22	6 21	6 19	6 18	6 16	6 15	6 13	6 11	6 09	6 07	6 05	6 03	R.	16
	S.	5 34	5 40	5 46	5 49	5 52	5 54	5 56	5 58	6 00	6 01	6 02	6 03	6 04	6 05	6 06	6 07	6 08	6 08	6 09	6 10	6 10	6 10	6 11	6 11	6 11	S.	
17	R.	6 24	6 29	6 32	6 32	6 33	6 32	6 32	6 31	6 30	6 29	6 28	6 26	6 25	6 23	6 22	6 20	6 19	6 17	6 15	6 13	6 11	6 09	6 07	6 05	6 03	R.	17
	S.	5 32	5 38	5 44	5 47	5 50	5 52	5 55	5 56	5 58	6 00	6 01	6 02	6 03	6 04	6 05	6 06	6 07	6 08	6 08	6 09	6 09	6 10	6 10	6 11	6 11	S.	
18	R.	6 26	6 31	6 33	6 34	6 34	6 34	6 33	6 32	6 31	6 30	6 29	6 27	6 26	6 24	6 23	6 21	6 19	6 17	6 15	6 13	6 11	6 09	6 07	6 05	6 03	R.	18
	S.	5 30	5 37	5 42	5 46	5 48	5 51	5 53	5 55	5 57	5 59	6 00	6 01	6 02	6 03	6 04	6 05	6 06	6 07	6 08	6 09	6 09	6 10	6 10	6 11	6 11	S.	
19	R.	6 28	6 33	6 35	6 36	6 36	6 35	6 35	6 34	6 33	6 31	6 30	6 28	6 27	6 25	6 24	6 22	6 20	6 18	6 16	6 14	6 12	6 10	6 07	6 05	6 03	R.	19
	S.	5 28	5 35	5 40	5 44	5 47	5 49	5 52	5 54	5 56	5 57	5 59	6 00	6 01	6 02	6 04	6 05	6 06	6 07	6 08	6 09	6 09	6 10	6 10	6 11	6 11	S.	
20	R.	6 30	6 35	6 37	6 37	6 37	6 37	6 36	6 35	6 34	6 32	6 31	6 29	6 28	6 26	6 24	6 22	6 20	6 18	6 16	6 14	6 12	6 10	6 07	6 05	6 03	R.	20
	S.	5 26	5 33	5 38	5 42	5 45	5 48	5 50	5 53	5 55	5 56	5 58	5 59	6 01	6 02	6 03	6 04	6 05	6 06	6 07	6 08	6 09	6 10	6 10	6 11	6 11	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

North Latitude: 21° to 40°—December 22 to March 21.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. N.	Approx. date.	DECEMBER.	JANUARY.						FEBRUARY.									MARCH.									Approx. date.	Lat. N.
		22	2	10	16	21	25	29	2	5	9	12	15	18	20	23	26	1	3	6	8	11	13	16	18	21		
	Dec. S.	23° 27′	23°	22°	21°	20°	19°	18°	17°	16°	15°	14°	13°	12°	11°	10°	9°	8°	7°	6°	5°	4°	3°	2°	1°	0°	Dec. S.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
21	R.	6 32	6 37	6 39	6 39	6 39	6 38	6 37	6 36	6 35	6 33	6 32	6 30	6 29	6 27	6 25	6 23	6 21	6 19	6 17	6 15	6 12	6 10	6 08	6 06	6 03	R.	21
	S.	5 24	5 31	5 36	5 40	5 43	5 46	5 49	5 51	5 53	5 55	5 57	5 58	6 00	6 01	6 02	6 03	6 04	6 06	6 07	6 08	6 08	6 09	6 10	6 11	6 11	S.	
22	R.	6 34	6 39	6 41	6 41	6 41	6 40	6 39	6 38	6 36	6 34	6 33	6 31	6 30	6 28	6 26	6 24	6 22	6 19	6 17	6 15	6 12	6 10	6 08	6 06	6 03	R.	22
	S.	5 22	5 29	5 35	5 39	5 42	5 45	5 47	5 50	5 52	5 54	5 56	5 57	5 59	6 00	6 02	6 03	6 04	6 05	6 06	6 08	6 08	6 09	6 10	6 11	6 11	S.	
23	R.	6 36	6 41	6 43	6 43	6 42	6 41	6 41	6 39	6 38	6 36	6 34	6 32	6 31	6 28	6 27	6 24	6 22	6 20	6 18	6 15	6 13	6 10	6 08	6 06	6 03	R.	23
	S.	5 20	5 27	5 33	5 37	5 40	5 43	5 46	5 48	5 51	5 53	5 54	5 56	5 58	5 59	6 01	6 02	6 03	6 05	6 06	6 07	6 08	6 09	6 10	6 11	6 11	S.	
24	R.	6 38	6 43	6 45	6 44	6 44	6 43	6 42	6 41	6 39	6 37	6 35	6 33	6 32	6 29	6 27	6 25	6 23	6 20	6 18	6 16	6 13	6 11	6 08	6 06	6 03	R.	24
	S.	5 18	5 25	5 31	5 35	5 39	5 42	5 44	5 47	5 49	5 51	5 53	5 55	5 57	5 58	6 00	6 02	6 03	6 04	6 05	6 07	6 08	6 09	6 10	6 11	6 11	S.	
25	R.	6 40	6 45	6 47	6 46	6 46	6 45	6 44	6 42	6 41	6 39	6 37	6 35	6 33	6 30	6 28	6 26	6 24	6 21	6 19	6 16	6 13	6 11	6 08	6 06	6 03	R.	25
	S.	5 16	5 23	5 29	5 33	5 37	5 40	5 43	5 45	5 48	5 50	5 52	5 54	5 56	5 57	5 59	6 01	6 02	6 03	6 05	6 06	6 07	6 08	6 09	6 10	6 11	S.	
26	R.	6 42	6 47	6 49	6 48	6 47	6 46	6 45	6 43	6 42	6 40	6 38	6 36	6 34	6 31	6 29	6 26	6 24	6 22	6 19	6 17	6 14	6 11	6 08	6 06	6 03	R.	26
	S.	5 14	5 21	5 27	5 31	5 35	5 38	5 41	5 44	5 47	5 49	5 51	5 53	5 55	5 57	5 59	6 00	6 01	6 03	6 04	6 06	6 07	6 08	6 09	6 10	6 11	S.	
27	R.	6 45	6 49	6 51	6 50	6 49	6 48	6 47	6 45	6 43	6 41	6 39	6 37	6 35	6 32	6 30	6 27	6 25	6 22	6 20	6 17	6 14	6 11	6 08	6 06	6 03	R.	27
	S.	5 12	5 18	5 25	5 29	5 33	5 37	5 40	5 43	5 45	5 48	5 50	5 52	5 54	5 56	5 58	5 59	6 01	6 02	6 04	6 05	6 06	6 08	6 09	6 10	6 11	S.	
28	R.	6 47	6 51	6 53	6 52	6 51	6 50	6 48	6 46	6 45	6 42	6 40	6 38	6 36	6 33	6 31	6 28	6 25	6 23	6 20	6 17	6 14	6 12	6 09	6 06	6 03	R.	28
	S.	5 10	5 16	5 23	5 27	5 31	5 35	5 38	5 41	5 44	5 46	5 49	5 51	5 53	5 55	5 57	5 59	6 00	6 02	6 03	6 05	6 06	6 08	6 09	6 10	6 11	S.	
29	R.	6 49	6 53	6 55	6 54	6 53	6 52	6 50	6 48	6 46	6 44	6 41	6 39	6 37	6 34	6 32	6 29	6 26	6 23	6 21	6 18	6 15	6 12	6 09	6 06	6 03	R.	29
	S.	5 07	5 14	5 21	5 25	5 29	5 33	5 36	5 39	5 42	5 45	5 47	5 50	5 52	5 54	5 56	5 58	5 59	6 01	6 03	6 05	6 06	6 08	6 09	6 10	6 11	S.	
30	R.	6 51	6 55	6 57	6 56	6 55	6 53	6 52	6 50	6 48	6 45	6 43	6 40	6 38	6 35	6 32	6 29	6 27	6 24	6 21	6 18	6 15	6 12	6 09	6 06	6 03	R.	30
	S.	5 05	5 12	5 19	5 23	5 27	5 31	5 35	5 38	5 41	5 43	5 46	5 48	5 51	5 53	5 55	5 57	5 59	6 01	6 02	6 04	6 06	6 08	6 09	6 10	6 12	S.	
31	R.	6 54	6 58	6 59	6 58	6 57	6 55	6 53	6 51	6 49	6 47	6 44	6 41	6 39	6 36	6 33	6 30	6 28	6 25	6 22	6 19	6 15	6 12	6 09	6 06	6 03	R.	31
	S.	5 03	5 10	5 16	5 21	5 25	5 29	5 33	5 36	5 39	5 42	5 44	5 47	5 50	5 52	5 54	5 56	5 58	6 00	6 02	6 04	6 05	6 07	6 09	6 10	6 12	S.	
32	R.	6 56	7 00	7 01	7 00	6 59	6 57	6 55	6 53	6 51	6 48	6 45	6 42	6 40	6 37	6 34	6 31	6 28	6 25	6 22	6 19	6 16	6 12	6 09	6 06	6 03	R.	32
	S.	5 00	5 07	5 14	5 19	5 23	5 27	5 31	5 35	5 38	5 41	5 43	5 46	5 49	5 51	5 53	5 55	5 57	5 59	6 01	6 03	6 05	6 07	6 09	6 10	6 12	S.	
33	R.	6 59	7 03	7 04	7 03	7 01	6 59	6 57	6 55	6 52	6 49	6 47	6 44	6 41	6 38	6 35	6 32	6 29	6 26	6 23	6 20	6 16	6 13	6 09	6 06	6 03	R.	33
	S.	4 58	5 05	5 12	5 17	5 21	5 25	5 29	5 33	5 36	5 39	5 42	5 45	5 47	5 50	5 52	5 54	5 56	5 59	6 01	6 03	6 05	6 07	6 08	6 10	6 12	S.	
34	R.	7 01	7 05	7 06	7 05	7 03	7 01	6 59	6 56	6 54	6 51	6 48	6 45	6 42	6 39	6 36	6 33	6 30	6 26	6 23	6 20	6 16	6 13	6 09	6 06	6 03	R.	34
	S.	4 55	5 02	5 10	5 15	5 19	5 24	5 28	5 31	5 35	5 38	5 40	5 43	5 46	5 49	5 51	5 54	5 56	5 58	6 00	6 02	6 04	6 06	6 08	6 10	6 12	S.	
35	R.	7 04	7 08	7 08	7 07	7 05	7 03	7 01	6 58	6 56	6 53	6 50	6 47	6 44	6 40	6 37	6 34	6 31	6 27	6 24	6 21	6 17	6 13	6 10	6 06	6 03	R.	35
	S.	4 53	5 00	5 07	5 13	5 17	5 22	5 26	5 29	5 33	5 36	5 39	5 42	5 45	5 47	5 50	5 53	5 55	5 57	6 00	6 02	6 04	6 06	6 08	6 10	6 12	S.	
36	R.	7 06	7 10	7 11	7 09	7 07	7 05	7 03	7 00	6 57	6 54	6 51	6 48	6 45	6 41	6 38	6 35	6 31	6 28	6 24	6 21	6 17	6 14	6 10	6 06	6 03	R.	36
	S.	4 50	4 57	5 05	5 10	5 15	5 20	5 24	5 28	5 31	5 34	5 37	5 41	5 44	5 46	5 49	5 52	5 54	5 57	5 59	6 01	6 03	6 06	6 08	6 10	6 12	S.	
37	R.	7 09	7 13	7 13	7 12	7 10	7 07	7 05	7 02	6 59	6 56	6 53	6 49	6 46	6 42	6 39	6 36	6 32	6 29	6 25	6 22	6 18	6 14	6 10	6 06	6 03	R.	37
	S.	4 47	4 55	5 02	5 08	5 13	5 17	5 22	5 26	5 29	5 33	5 36	5 39	5 42	5 45	5 48	5 51	5 53	5 56	5 58	6 01	6 03	6 05	6 07	6 10	6 12	S.	
38	R.	7 12	7 16	7 16	7 14	7 12	7 09	7 07	7 04	7 01	6 57	6 54	6 51	6 47	6 43	6 40	6 36	6 33	6 29	6 26	6 22	6 18	6 14	6 10	6 06	6 02	R.	38
	S.	4 44	4 52	5 00	5 05	5 10	5 15	5 20	5 24	5 28	5 31	5 34	5 38	5 41	5 44	5 47	5 50	5 53	5 55	5 58	6 00	6 03	6 05	6 07	6 10	6 12	S.	
39	R.	7 15	7 19	7 19	7 17	7 15	7 12	7 09	7 06	7 03	6 59	6 56	6 52	6 49	6 45	6 41	6 37	6 34	6 30	6 26	6 23	6 18	6 14	6 10	6 06	6 02	R.	39
	S.	4 41	4 49	4 57	5 03	5 08	5 13	5 17	5 22	5 26	5 29	5 33	5 36	5 40	5 43	5 46	5 49	5 52	5 54	5 57	6 00	6 02	6 05	6 07	6 10	6 12	S.	
40	R.	7 18	7 22	7 21	7 19	7 17	7 14	7 11	7 08	7 05	7 01	6 57	6 54	6 50	6 46	6 42	6 38	6 35	6 31	6 27	6 23	6 19	6 15	6 10	6 06	6 02	R.	40
	S.	4 38	4 46	4 54	5 00	5 05	5 10	5 15	5 20	5 24	5 28	5 31	5 35	5 38	5 41	5 45	5 48	5 51	5 53	5 56	5 59	6 02	6 05	6 07	6 10	6 12	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

North Latitude: 41° to 60°—December 22 to March 21.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. N.	Approx. date.	DECEMBER.	JANUARY.						FEBRUARY.									MARCH.									Approx. date.	Lat. N.
		22	2	10	16	21	25	29	2	5	9	12	15	18	20	23	26	1	3	6	8	11	13	16	18	21		
	Dec. S.	23° 27′	23°	22°	21°	20°	19°	18°	17°	16°	15°	14°	13°	12°	11°	10°	9°	8°	7°	6°	5°	4°	3°	2°	1°	0°	Dec. S.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
41	R.	7 21	7 25	7 24	7 22	7 20	7 17	7 14	7 10	7 07	7 03	6 59	6 55	6 52	6 48	6 44	6 40	6 36	6 32	6 28	6 24	6 19	6 15	6 11	6 07	6 02	R.	41
	S.	4 35	4 43	4 51	4 57	5 03	5 08	5 13	5 17	5 22	5 26	5 29	5 33	5 37	5 40	5 44	5 47	5 50	5 53	5 56	5 59	6 01	6 04	6 07	6 10	6 12	S.	
42	R.	7 24	7 28	7 27	7 25	7 22	7 19	7 16	7 12	7 09	7 05	7 01	6 57	6 53	6 49	6 45	6 41	6 37	6 32	6 28	6 24	6 20	6 15	6 11	6 07	6 02	R.	42
	S.	4 32	4 40	4 48	4 55	5 00	5 06	5 11	5 15	5 20	5 24	5 28	5 32	5 35	5 39	5 43	5 46	5 49	5 52	5 55	5 58	6 01	6 04	6 07	6 10	6 12	S.	
43	R.	7 28	7 31	7 30	7 28	7 25	7 21	7 18	7 14	7 11	7 07	7 03	6 59	6 55	6 50	6 46	6 42	6 38	6 33	6 29	6 25	6 20	6 16	6 11	6 07	6 02	R.	43
	S.	4 29	4 37	4 45	4 52	4 58	5 03	5 08	5 13	5 18	5 22	5 26	5 30	5 34	5 37	5 41	5 45	5 48	5 51	5 54	5 58	6 01	6 04	6 07	6 10	6 12	S.	
44	R.	7 31	7 34	7 33	7 31	7 28	7 24	7 21	7 17	7 13	7 09	7 04	7 00	6 56	6 52	6 48	6 43	6 39	6 34	6 30	6 25	6 20	6 16	6 11	6 07	6 02	R.	44
	S.	4 25	4 33	4 42	4 49	4 55	5 00	5 06	5 11	5 16	5 20	5 24	5 28	5 32	5 36	5 40	5 43	5 47	5 50	5 54	5 57	6 00	6 03	6 06	6 10	6 13	S.	
45	R.	7 35	7 38	7 37	7 34	7 31	7 27	7 23	7 19	7 15	7 11	7 06	7 02	6 58	6 53	6 49	6 44	6 40	6 35	6 30	6 26	6 21	6 16	6 11	6 07	6 02	R.	45
	S.	4 22	4 30	4 39	4 46	4 52	4 58	5 03	5 08	5 13	5 18	5 22	5 27	5 31	5 35	5 39	5 42	5 46	5 50	5 53	5 57	6 00	6 03	6 06	6 10	6 13	S.	
46	R.	7 38	7 41	7 40	7 37	7 34	7 30	7 26	7 22	7 17	7 13	7 08	7 04	6 59	6 55	6 50	6 45	6 41	6 36	6 31	6 26	6 21	6 16	6 11	6 07	6 02	R.	46
	S.	4 18	4 26	4 35	4 42	4 49	4 55	5 01	5 06	5 11	5 16	5 20	5 25	5 29	5 33	5 37	5 41	5 45	5 49	5 52	5 56	5 59	6 03	6 06	6 10	6 13	S.	
47	R.	7 42	7 45	7 44	7 41	7 37	7 33	7 29	7 24	7 20	7 15	7 10	7 06	7 01	6 56	6 52	6 47	6 42	6 37	6 32	6 27	6 22	6 17	6 12	6 07	6 02	R.	47
	S.	4 14	4 22	4 32	4 39	4 46	4 52	4 58	5 03	5 09	5 14	5 18	5 23	5 27	5 31	5 36	5 40	5 44	5 48	5 52	5 56	5 59	6 03	6 06	6 10	6 13	S.	
48	R.	7 46	7 49	7 48	7 44	7 40	7 36	7 32	7 27	7 22	7 17	7 12	7 08	7 03	6 58	6 53	6 48	6 43	6 38	6 33	6 28	6 22	6 17	6 12	6 07	6 02	R.	48
	S.	4 10	4 18	4 28	4 35	4 42	4 49	4 55	5 01	5 06	5 11	5 16	5 21	5 26	5 30	5 34	5 39	5 43	5 47	5 51	5 55	5 58	6 02	6 06	6 10	6 13	S.	
49	R.	7 51	7 53	7 52	7 48	7 44	7 39	7 35	7 30	7 25	7 20	7 15	7 10	7 05	6 59	6 54	6 49	6 44	6 39	6 33	6 28	6 23	6 18	6 12	6 07	6 01	R.	49
	S.	4 06	4 14	4 24	4 32	4 39	4 45	4 52	4 58	5 03	5 09	5 14	5 19	5 24	5 28	5 33	5 37	5 41	5 46	5 50	5 54	5 58	6 02	6 06	6 10	6 13	S.	
50	R.	7 55	7 58	7 56	7 52	7 48	7 43	7 38	7 33	7 28	7 22	7 17	7 12	7 07	7 01	6 56	6 51	6 45	6 40	6 34	6 29	6 23	6 18	6 12	6 07	6 01	R.	50
	S.	4 01	4 10	4 20	4 28	4 35	4 42	4 49	4 55	5 01	5 06	5 11	5 17	5 22	5 26	5 31	5 36	5 40	5 45	5 49	5 53	5 57	6 01	6 05	6 10	6 13	S.	
51	R.	8 00	8 02	8 00	7 56	7 51	7 46	7 41	7 36	7 31	7 25	7 20	7 14	7 09	7 03	6 58	6 52	6 47	6 41	6 35	6 30	6 24	6 19	6 13	6 07	6 01	R.	51
	S.	3 56	4 05	4 15	4 24	4 31	4 38	4 45	4 52	4 58	5 03	5 09	5 14	5 20	5 25	5 30	5 34	5 39	5 43	5 48	5 52	5 56	6 01	6 05	6 09	6 13	S.	
52	R.	8 05	8 07	8 05	8 00	7 55	7 50	7 45	7 39	7 34	7 28	7 22	7 16	7 11	7 05	6 59	6 54	6 48	6 42	6 36	6 31	6 25	6 19	6 13	6 07	6 01	R.	52
	S.	3 51	4 00	4 11	4 19	4 27	4 35	4 42	4 48	4 55	5 01	5 06	5 12	5 18	5 23	5 28	5 33	5 38	5 42	5 47	5 52	5 56	6 01	6 05	6 09	6 13	S.	
53	R.	8 11	8 13	8 10	8 05	7 59	7 54	7 48	7 43	7 37	7 31	7 25	7 19	7 13	7 07	7 01	6 55	6 49	6 43	6 37	6 31	6 25	6 19	6 13	6 07	6 01	R.	53
	S.	3 46	3 55	4 06	4 15	4 23	4 31	4 38	4 45	4 52	4 58	5 04	5 10	5 15	5 21	5 26	5 31	5 36	5 41	5 46	5 51	5 55	6 00	6 04	6 09	6 13	S.	
54	R.	8 16	8 18	8 15	8 09	8 04	7 58	7 52	7 46	7 40	7 34	7 28	7 21	7 15	7 09	7 03	6 57	6 51	6 44	6 38	6 32	6 26	6 20	6 13	6 07	6 01	R.	54
	S.	3 40	3 49	4 01	4 10	4 19	4 27	4 34	4 41	4 48	4 55	5 01	5 07	5 13	5 19	5 24	5 30	5 35	5 40	5 45	5 50	5 55	6 00	6 04	6 09	6 14	S.	
55	R.	8 22	8 24	8 20	8 15	8 09	8 02	7 56	7 50	7 44	7 37	7 31	7 24	7 18	7 11	7 05	6 59	6 52	6 46	6 40	6 33	6 27	6 20	6 13	6 07	6 01	R.	55
	S.	3 34	3 44	3 55	4 05	4 14	4 22	4 30	4 38	4 45	4 51	4 58	5 04	5 11	5 16	5 22	5 28	5 33	5 39	5 44	5 49	5 54	5 59	6 04	6 09	6 14	S.	
56	R.	8 29	8 30	8 26	8 20	8 14	8 07	8 01	7 54	7 47	7 41	7 34	7 27	7 21	7 14	7 07	7 01	6 54	6 47	6 41	6 34	6 27	6 21	6 14	6 07	6 01	R.	56
	S.	3 27	3 37	3 49	3 59	4 08	4 17	4 26	4 34	4 41	4 48	4 55	5 01	5 08	5 14	5 20	5 26	5 32	5 37	5 43	5 48	5 53	5 59	6 04	6 09	6 14	S.	
57	R.	8 36	8 37	8 32	8 26	8 19	8 12	8 05	7 58	7 51	7 44	7 37	7 30	7 23	7 16	7 10	7 03	6 56	6 49	6 42	6 35	6 28	6 21	6 14	6 07	6 00	R.	57
	S.	3 20	3 30	3 43	3 54	4 03	4 12	4 21	4 29	4 37	4 44	4 51	4 58	5 05	5 11	5 18	5 24	5 30	5 36	5 41	5 47	5 52	5 58	6 03	6 09	6 14	S.	
58	R.	8 44	8 44	8 39	8 32	8 25	8 17	8 10	8 03	7 55	7 48	7 41	7 33	7 26	7 19	7 12	7 05	6 57	6 50	6 43	6 36	6 29	6 22	6 14	6 07	6 00	R.	58
	S.	3 13	3 23	3 36	3 47	3 57	4 07	4 16	4 25	4 33	4 41	4 48	4 55	5 02	5 09	5 16	5 22	5 28	5 34	5 40	5 46	5 52	5 58	6 03	6 09	6 14	S.	
59	R.	8 52	8 52	8 46	8 39	8 31	8 23	8 15	8 08	8 00	7 52	7 44	7 37	7 29	7 21	7 14	7 07	6 59	6 52	6 45	6 37	6 30	6 22	6 15	6 07	6 00	R.	59
	S.	3 05	3 15	3 29	3 41	3 52	4 02	4 11	4 20	4 29	4 37	4 44	4 52	4 59	5 06	5 13	5 20	5 26	5 33	5 39	5 45	5 51	5 57	6 03	6 09	6 15	S.	
60	R.	9 01	9 01	8 54	8 46	8 38	8 29	8 21	8 13	8 05	7 56	7 48	7 40	7 32	7 24	7 17	7 09	7 01	6 54	6 46	6 39	6 31	6 23	6 15	6 08	6 00	R.	60
	S.	2 56	3 06	3 21	3 34	3 45	3 55	4 05	4 15	4 24	4 32	4 40	4 48	4 56	5 03	5 10	5 17	5 24	5 31	5 37	5 44	5 50	5 56	6 02	6 09	6 15	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

South latitude: 0° to 20°—March 21 to June 22.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. S.	Approx. date	MARCH.					APRIL.										MAY.							JUNE.			Approx. date	Lat. S.
		21	23	26	28	31	3	5	8	11	13	16	19	22	25	28	1	5	8	12	16	21	26	1	10	22		
	Dec. N.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	23° 27′	Dec. N.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
0	R.	6 04	6 03	6 02	6 01	6 00	6 00	5 59	5 58	5 57	5 57	5 56	5 55	5 55	5 54	5 54	5 53	5 53	5 52	5 52	5 52	5 52	5 53	5 54	5 55	5 57	R.	0
	S.	6 11	6 11	6 10	6 09	6 08	6 08	6 07	6 06	6 05	6 05	6 04	6 03	6 03	6 02	6 02	6 01	6 01	6 00	6 00	6 00	6 00	6 01	6 02	6 03	6 05	S.	
1	R.	6 04	6 03	6 02	6 02	6 01	6 00	5 59	5 58	5 58	5 58	5 57	5 56	5 56	5 55	5 55	5 54	5 54	5 54	5 54	5 54	5 54	5 54	5 55	5 57	5 59	R.	1
	S.	6 11	6 10	6 09	6 09	6 08	6 07	6 06	6 05	6 04	6 04	6 03	6 02	6 02	6 01	6 01	6 00	5 59	5 59	5 59	5 59	5 59	5 59	6 00	6 02	6 04	S.	
2	R.	6 04	6 03	6 02	6 02	6 01	6 00	6 00	5 59	5 59	5 58	5 57	5 57	5 56	5 56	5 56	5 55	5 55	5 55	5 55	5 55	5 55	5 56	5 57	5 58	6 01	R.	2
	S.	6 11	6 10	6 09	6 09	6 08	6 07	6 06	6 05	6 04	6 03	6 02	6 02	6 01	6 00	6 00	5 59	5 58	5 58	5 58	5 58	5 57	5 58	5 59	6 00	6 03	S.	
3	R.	6 04	6 03	6 02	6 02	6 01	6 01	6 00	5 59	5 59	5 59	5 58	5 57	5 57	5 57	5 57	5 56	5 56	5 56	5 56	5 56	5 57	5 57	5 58	6 00	6 03	R.	3
	S.	6 11	6 10	6 09	6 08	6 07	6 06	6 05	6 04	6 03	6 03	6 02	6 01	6 00	6 00	5 59	5 58	5 57	5 57	5 56	5 56	5 56	5 56	5 57	5 59	6 01	S.	
4	R.	6 04	6 03	6 02	6 02	6 01	6 01	6 00	6 00	6 00	5 59	5 58	5 58	5 58	5 58	5 58	5 57	5 57	5 57	5 57	5 58	5 58	5 59	6 00	6 01	6 04	R.	4
	S.	6 11	6 10	6 09	6 08	6 07	6 06	6 05	6 04	6 03	6 02	6 01	6 00	5 59	5 59	5 58	5 57	5 56	5 56	5 55	5 55	5 55	5 55	5 56	5 57	5 59	S.	
5	R.	6 04	6 03	6 02	6 02	6 02	6 01	6 01	6 00	6 00	6 00	5 59	5 59	5 59	5 59	5 59	5 58	5 58	5 58	5 59	5 59	5 59	6 00	6 02	6 03	6 06	R.	5
	S.	6 11	6 10	6 09	6 08	6 07	6 06	6 05	6 03	6 02	6 01	6 00	5 59	5 58	5 58	5 57	5 56	5 55	5 54	5 54	5 53	5 53	5 53	5 54	5 55	5 57	S.	
6	R.	6 03	6 03	6 02	6 02	6 02	6 02	6 01	6 01	6 01	6 01	6 00	6 00	6 00	6 00	6 00	6 00	6 00	6 00	6 00	6 00	6 01	6 02	6 03	6 05	6 08	R.	6
	S.	6 11	6 10	6 09	6 08	6 07	6 06	6 04	6 03	6 02	6 01	6 00	5 59	5 58	5 57	5 56	5 55	5 54	5 53	5 53	5 52	5 52	5 52	5 52	5 54	5 56	S.	
7	R.	6 03	6 03	6 03	6 03	6 02	6 02	6 02	6 01	6 01	6 01	6 01	6 01	6 01	6 01	6 01	6 01	6 01	6 01	6 01	6 02	6 02	6 03	6 05	6 07	6 10	R.	7
	S.	6 11	6 10	6 09	6 08	6 06	6 05	6 04	6 02	6 01	6 00	5 59	5 58	5 57	5 56	5 55	5 54	5 53	5 52	5 51	5 51	5 50	5 50	5 51	5 52	5 54	S.	
8	R.	6 03	6 03	6 03	6 03	6 02	6 02	6 02	6 02	6 02	6 02	6 01	6 01	6 02	6 02	6 02	6 02	6 02	6 02	6 02	6 03	6 04	6 05	6 06	6 08	6 11	R.	8
	S.	6 11	6 10	6 09	6 08	6 06	6 05	6 04	6 02	6 01	6 00	5 58	5 57	5 56	5 55	5 54	5 53	5 52	5 51	5 50	5 50	5 49	5 49	5 49	5 50	5 52	S.	
9	R.	6 03	6 03	6 03	6 03	6 03	6 03	6 02	6 02	6 02	6 02	6 02	6 02	6 03	6 03	6 03	6 03	6 03	6 03	6 04	6 04	6 05	6 06	6 08	6 10	6 13	R.	9
	S.	6 11	6 10	6 09	6 08	6 06	6 05	6 03	6 01	6 60	5 59	5 57	5 56	5 55	5 54	5 53	5 52	5 50	5 49	5 49	5 48	5 47	5 47	5 47	5 48	5 50	S.	
10	R.	6 03	6 03	6 03	6 03	6 03	6 03	6 03	6 03	6 03	6 03	6 03	6 03	6 03	6 03	6 04	6 04	6 04	6 04	6 05	6 06	6 07	6 08	6 10	6 12	6 15	R.	10
	S.	6 11	6 10	6 09	6 08	6 06	6 05	6 03	6 01	5 59	5 58	5 57	5 56	5 54	5 53	5 52	5 51	5 49	5 48	5 48	5 47	5 46	5 46	5 46	5 47	5 49	S.	
11	R.	6 03	6 03	6 03	6 03	6 03	6 03	6 03	6 03	6 04	6 04	6 04	6 04	6 04	6 04	6 05	6 05	6 05	6 05	6 06	6 07	6 08	6 09	6 11	6 14	6 17	R.	11
	S.	6 11	6 10	6 08	6 07	6 05	6 04	6 02	6 00	5 59	5 58	5 56	5 55	5 53	5 52	5 51	5 50	5 48	5 47	5 46	5 45	5 44	5 44	5 44	5 45	5 47	S.	
12	R.	6 03	6 03	6 03	6 04	6 04	6 04	6 04	6 04	6 04	6 04	6 04	6 05	6 05	6 05	6 06	6 06	6 06	6 07	6 08	6 09	6 10	6 11	6 13	6 15	6 18	R.	12
	S.	6 11	6 10	6 08	6 07	6 05	6 04	6 02	6 00	5 58	5 57	5 55	5 54	5 52	5 51	5 50	5 49	5 47	5 46	5 45	5 44	5 43	5 43	5 43	5 43	5 45	S.	
13	R.	6 03	6 04	6 04	6 04	6 04	6 04	6 04	6 04	6 05	6 05	6 05	6 06	6 06	6 06	6 07	6 07	6 08	6 08	6 09	6 10	6 11	6 13	6 15	6 17	6 20	R.	13
	S.	6 11	6 10	6 08	6 06	6 04	6 03	6 01	5 59	5 58	5 56	5 54	5 53	5 51	5 50	5 49	5 47	5 46	5 44	5 43	5 42	5 41	5 41	5 41	5 41	5 43	S.	
14	R.	6 03	6 04	6 04	6 04	6 04	6 05	6 05	6 05	6 05	6 06	6 06	6 06	6 07	6 07	6 08	6 08	6 09	6 10	6 11	6 12	6 13	6 14	6 16	6 19	6 22	R.	14
	S.	6 11	6 10	6 08	6 06	6 04	6 03	6 01	5 59	5 57	5 56	5 54	5 52	5 51	5 49	5 48	5 46	5 45	5 43	5 42	5 41	5 40	5 39	5 39	5 40	5 42	S.	
15	R.	6 03	6 04	6 04	6 05	6 05	6 05	6 05	6 05	6 06	6 06	6 06	6 07	6 08	6 08	6 09	6 09	6 10	6 11	6 12	6 13	6 14	6 16	6 18	6 21	6 24	R.	15
	S.	6 11	6 10	6 08	6 06	6 04	6 02	6 00	5 58	5 57	5 55	5 53	5 52	5 50	5 48	5 47	5 46	5 43	5 42	5 41	5 39	5 38	5 38	5 37	5 38	5 40	S.	
16	R.	6 03	6 04	6 04	6 05	6 05	6 05	6 06	6 06	6 06	6 07	6 07	6 08	6 09	6 09	6 10	6 10	6 11	6 12	6 13	6 15	6 16	6 18	6 20	6 23	6 26	R.	16
	S.	6 11	6 10	6 08	6 06	6 04	6 02	6 00	5 58	5 56	5 54	5 52	5 51	5 49	5 47	5 46	5 44	5 42	5 40	5 39	5 38	5 37	5 36	5 36	5 36	5 38	S.	
17	R.	6 03	6 04	6 04	6 05	6 05	6 06	6 06	6 06	6 07	6 08	6 08	6 09	6 10	6 10	6 11	6 12	6 13	6 14	6 15	6 16	6 18	6 20	6 22	6 25	6 28	R.	17
	S.	6 11	6 10	6 08	6 06	6 04	6 02	6 00	5 58	5 56	5 54	5 52	5 50	5 48	5 46	5 44	5 43	5 41	5 39	5 38	5 36	5 35	5 34	5 34	5 34	5 36	S.	
18	R.	6 03	6 04	6 04	6 05	6 05	6 06	6 06	6 07	6 08	6 08	6 09	6 10	6 11	6 11	6 12	6 13	6 14	6 15	6 16	6 18	6 19	6 21	6 23	6 26	6 30	R.	18
	S.	6 11	6 09	6 07	6 05	6 03	6 01	5 59	5 57	5 55	5 53	5 51	5 49	5 47	5 45	5 43	5 42	5 40	5 38	5 36	5 35	5 33	5 33	5 32	5 32	5 34	S.	
19	R.	6 03	6 04	6 04	6 05	6 06	6 06	6 07	6 07	6 08	6 09	6 10	6 11	6 12	6 12	6 13	6 14	6 15	6 16	6 18	6 19	6 21	6 23	6 25	6 28	6 32	R.	19
	S.	6 11	6 09	6 07	6 05	6 03	6 01	5 59	5 56	5 54	5 52	5 50	5 48	5 46	5 44	5 42	5 40	5 38	5 36	5 35	5 33	5 32	5 31	5 30	5 30	5 32	S.	
20	R.	6 03	6 04	6 04	6 05	6 06	6 07	6 07	6 08	6 09	6 10	6 10	6 11	6 12	6 13	6 14	6 15	6 16	6 17	6 19	6 21	6 22	6 24	6 27	6 30	6 34	R.	20
	S.	6 11	6 09	6 07	6 05	6 03	6 01	5 58	5 56	5 54	5 52	5 49	5 47	5 45	5 43	5 41	5 39	5 37	5 35	5 33	5 32	5 30	5 29	5 28	5 28	5 30	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

South latitude: 21° to 40°—March 21 to June 22.

[R—Local mean time of sun's visible rising. S—Local mean time of sun's visible setting.]

Lat. S.	Approx. date.	MARCH.					APRIL.										MAY.							JUNE.			Approx. date.	Lat. S.
		21	23	26	28	31	3	5	8	11	13	16	19	22	25	28	1	5	8	12	16	21	26	1	10	22		
	Dec. N.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	23° 27′	Dec. N.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
21	R.	6 03	6 04	6 05	6 06	6 06	6 07	6 08	6 09	6 10	6 11	6 11	6 12	6 13	6 14	6 15	6 16	6 18	6 19	6 21	6 22	6 24	6 26	6 29	6 32	6 36	R.	21
	S.	6 11	6 09	6 07	6 05	6 02	6 00	5 58	5 55	5 53	5 51	5 48	5 46	5 44	5 42	5 40	5 38	5 36	5 34	5 32	5 30	5 28	5 27	5 26	5 26	5 28	S.	
22	R.	6 03	6 04	6 05	6 06	6 06	6 07	6 08	6 09	6 10	6 11	6 12	6 13	6 14	6 15	6 16	6 17	6 19	6 20	6 22	6 24	6 26	6 28	6 31	6 34	6 38	R.	22
	S.	6 11	6 09	6 07	6 05	6 02	6 00	5 57	5 55	5 52	5 50	5 48	5 46	5 43	5 41	5 39	5 37	5 35	5 33	5 31	5 29	5 27	5 26	5 25	5 24	5 26	S.	
23	R.	6 03	6 04	6 05	6 06	6 07	6 08	6 09	6 10	6 11	6 12	6 13	6 14	6 15	6 16	6 17	6 19	6 20	6 22	6 24	6 25	6 27	6 30	6 33	6 36	6 40	R.	23
	S.	6 11	6 09	6 07	6 05	6 02	6 00	5 57	5 54	5 52	5 50	5 47	5 45	5 42	5 40	5 37	5 35	5 33	5 31	5 29	5 27	5 25	5 24	5 23	5 22	5 24	S.	
24	R.	6 03	6 04	6 05	6 06	6 07	6 08	6 09	6 10	6 11	6 12	6 13	6 15	6 16	6 17	6 18	6 20	6 22	6 23	6 25	6 27	6 29	6 31	6 34	6 38	6 42	R.	24
	S.	6 11	6 09	6 07	6 04	6 01	5 59	5 56	5 54	5 51	5 49	5 46	5 44	5 41	5 39	5 36	5 34	5 32	5 30	5 28	5 26	5 24	5 22	5 21	5 20	5 22	S.	
25	R.	6 03	6 04	6 05	6 07	6 08	6 09	6 10	6 11	6 12	6 13	6 14	6 16	6 17	6 19	6 20	6 22	6 23	6 25	6 27	6 29	6 31	6 33	6 36	6 40	6 44	R.	25
	S.	6 11	6 09	6 06	6 04	6 01	5 59	5 56	5 53	5 50	5 48	5 45	5 43	5 40	5 38	5 35	5 33	5 30	5 28	5 26	5 24	5 22	5 20	5 19	5 18	5 20	S.	
26	R.	6 03	6 04	6 05	6 07	6 08	6 09	6 10	6 11	6 13	6 14	6 15	6 16	6 18	6 20	6 21	6 23	6 24	6 26	6 28	6 30	6 32	6 35	6 39	6 42	6 46	R.	26
	S.	6 11	6 09	6 06	6 04	6 01	5 58	5 55	5 52	5 50	5 48	5 45	5 42	5 39	5 37	5 34	5 32	5 29	5 27	5 24	5 22	5 20	5 18	5 17	5 16	5 18	S.	
27	R.	6 03	6 04	6 05	6 07	6 08	6 10	6 11	6 12	6 13	6 15	6 16	6 17	6 19	6 21	6 22	6 24	6 26	6 28	6 30	6 32	6 34	6 37	6 41	6 45	6 48	R.	27
	S.	6 11	6 09	6 06	6 03	6 00	5 58	5 55	5 52	5 49	5 47	5 44	5 41	5 38	5 36	5 33	5 31	5 28	5 25	5 23	5 21	5 18	5 16	5 15	5 14	5 15	S.	
28	R.	6 03	6 04	6 06	6 07	6 08	6 10	6 11	6 12	6 14	6 15	6 17	6 18	6 20	6 22	6 23	6 25	6 27	6 29	6 31	6 34	6 36	6 39	6 43	6 47	6 50	R.	28
	S.	6 11	6 09	6 06	6 03	6 00	5 57	5 54	5 51	5 49	5 46	5 43	5 40	5 37	5 35	5 32	5 29	5 26	5 24	5 21	5 19	5 16	5 14	5 13	5 12	5 13	S.	
29	R.	6 03	6 04	6 06	6 07	6 09	6 10	6 12	6 13	6 15	6 16	6 18	6 19	6 21	6 23	6 24	6 27	6 29	6 31	6 33	6 36	6 38	6 41	6 45	6 49	6 53	R.	29
	S.	6 11	6 09	6 06	6 03	6 00	5 57	5 54	5 51	5 48	5 45	5 42	5 39	5 36	5 33	5 30	5 28	5 25	5 22	5 19	5 17	5 14	5 12	5 11	5 10	5 11	S.	
30	R.	6 03	6 04	6 06	6 07	6 09	6 11	6 12	6 13	6 15	6 17	6 18	6 20	6 22	6 24	6 26	6 28	6 30	6 32	6 35	6 37	6 40	6 43	6 47	6 51	6 55	R.	30
	S.	6 12	6 09	6 06	6 03	6 00	5 57	5 53	5 50	5 47	5 44	5 41	5 38	5 35	5 32	5 29	5 26	5 23	5 20	5 18	5 15	5 12	5 10	5 09	5 08	5 09	S.	
31	R.	6 03	6 04	6 06	6 08	6 09	6 11	6 13	6 14	6 16	6 18	6 19	6 21	6 23	6 25	6 28	6 30	6 32	6 34	6 36	6 39	6 42	6 45	6 49	6 53	6 57	R.	31
	S.	6 12	6 09	6 06	6 03	5 59	5 56	5 53	5 49	5 46	5 43	5 40	5 37	5 34	5 31	5 28	5 25	5 22	5 19	5 16	5 13	5 10	5 08	5 06	5 05	5 06	S.	
32	R.	6 03	6 05	6 06	6 08	6 10	6 12	6 13	6 15	6 17	6 19	6 20	6 22	6 24	6 26	6 29	6 31	6 33	6 35	6 38	6 41	6 44	6 47	6 51	6 56	7 00	R.	32
	S.	6 12	6 09	6 06	6 03	5 59	5 56	5 52	5 49	5 46	5 43	5 39	5 36	5 33	5 30	5 27	5 24	5 20	5 17	5 14	5 11	5 08	5 06	5 04	5 03	5 04	S.	
33	R.	6 03	6 05	6 06	6 08	6 10	6 12	6 14	6 15	6 17	6 19	6 21	6 23	6 26	6 28	6 30	6 32	6 35	6 37	6 40	6 43	6 46	6 50	6 54	6 58	7 02	R.	33
	S.	6 12	6 09	6 05	6 02	5 58	5 55	5 52	5 48	5 45	5 42	5 38	5 35	5 32	5 29	5 25	5 22	5 19	5 15	5 12	5 09	5 06	5 04	5 02	5 00	5 01	S.	
34	R.	6 03	6 05	6 07	6 09	6 11	6 13	6 14	6 16	6 18	6 20	6 22	6 24	6 27	6 29	6 32	6 34	6 36	6 39	6 42	6 45	6 48	6 52	6 56	7 01	7 05	R.	34
	S.	6 12	6 09	6 05	6 02	5 58	5 55	5 51	5 48	5 44	5 41	5 37	5 34	5 31	5 27	5 24	5 21	5 17	5 14	5 11	5 07	5 04	5 02	5 00	4 58	4 59	S.	
35	R.	6 03	6 05	6 07	6 09	6 11	6 13	6 15	6 17	6 19	6 21	6 23	6 26	6 28	6 31	6 33	6 36	6 38	6 41	6 44	6 47	6 50	6 54	6 58	7 03	7 07	R.	35
	S.	6 12	6 09	6 05	6 02	5 58	5 54	5 51	5 47	5 43	5 40	5 36	5 33	5 29	5 26	5 22	5 19	5 15	5 12	5 09	5 06	5 02	5 00	4 57	4 55	4 56	S.	
36	R.	6 03	6 05	6 07	6 09	6 11	6 14	6 16	6 18	6 20	6 22	6 24	6 27	6 29	6 32	6 35	6 37	6 40	6 43	6 46	6 49	6 52	6 56	7 01	7 06	7 10	R.	36
	S.	6 12	6 09	6 05	6 01	5 57	5 54	5 50	5 46	5 43	5 39	5 35	5 32	5 28	5 25	5 21	5 17	5 14	5 10	5 07	5 04	5 00	4 57	4 55	4 53	4 54	S.	
37	R.	6 03	6 05	6 07	6 10	6 12	6 14	6 16	6 18	6 21	6 23	6 25	6 28	6 31	6 33	6 36	6 39	6 42	6 45	6 48	6 51	6 55	6 59	7 03	7 08	7 13	R.	37
	S.	6 12	6 08	6 04	6 01	5 57	5 53	5 49	5 45	5 42	5 38	5 34	5 31	5 27	5 23	5 19	5 16	5 12	5 08	5 05	5 01	4 58	4 55	4 52	4 50	4 51	S.	
38	R.	6 02	6 05	6 07	6 10	6 12	6 15	6 17	6 19	6 21	6 24	6 26	6 29	6 32	6 35	6 38	6 40	6 43	6 46	6 50	6 53	6 57	7 01	7 06	7 11	7 16	R.	38
	S.	6 12	6 08	6 04	6 01	5 57	5 53	5 49	5 45	5 41	5 37	5 33	5 30	5 26	5 22	5 18	5 14	5 10	5 06	5 03	4 59	4 55	4 52	4 50	4 47	4 48	S.	
39	R.	6 02	6 05	6 07	6 10	6 12	6 15	6 17	6 20	6 22	6 25	6 27	6 30	6 33	6 36	6 39	6 42	6 45	6 48	6 52	6 56	7 00	7 04	7 09	7 14	7 19	R.	39
	S.	6 12	6 08	6 04	6 00	5 56	5 52	5 48	5 44	5 40	5 36	5 32	5 28	5 24	5 20	5 16	5 12	5 08	5 04	5 00	4 57	4 53	4 50	4 47	4 44	4 45	S.	
40	R.	6 02	6 05	6 07	6 10	6 13	6 16	6 18	6 21	6 23	6 26	6 28	6 31	6 35	6 38	6 41	6 44	6 47	6 50	6 54	6 58	7 02	7 06	7 11	7 17	7 22	R.	40
	S.	6 12	6 08	6 04	6 00	5 56	5 52	5 47	5 43	5 39	5 35	5 31	5 27	5 23	5 19	5 15	5 11	5 06	5 02	4 58	4 54	4 50	4 47	4 44	4 41	4 42	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

South Latitude: 41° to 60°—March 21 to June 22.

[R—Local mean time of sun's visible rising. S—Local mean time of sun's visible setting.]

Lat. S.	Approx. date	MARCH.					APRIL.										MAY.							JUNE.			Approx. date	Lat. S.
		21	23	26	28	31	3	5	8	11	13	16	19	22	25	28	1	5	8	12	16	21	26	1	10	22		
	Dec. N.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	23° 27′	Dec. N.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
41	R.	6 02	6 05	6 08	6 11	6 13	6 16	6 19	6 21	6 24	6 27	6 30	6 33	6 36	6 39	6 43	6 46	6 49	6 53	6 57	7 01	7 05	7 09	7 14	7 20	7 25	R.	41
	S.	6 12	6 08	6 04	6 00	5 55	5 51	5 47	5 42	5 38	5 34	5 30	5 26	5 21	5 17	5 13	5 09	5 04	5 00	4 56	4 52	4 48	4 44	4 41	4 38	4 39	S.	
42	R.	6 02	6 05	6 08	6 11	6 14	6 17	6 19	6 22	6 25	6 28	6 31	6 34	6 38	6 41	6 44	6 48	6 51	6 55	6 59	7 03	7 07	7 12	7 17	7 23	7 28	R.	42
	S.	6 12	6 08	6 04	6 00	5 55	5 51	5 46	5 42	5 37	5 33	5 29	5 24	5 20	5 16	5 11	5 07	5 02	4 58	4 54	4 50	4 46	4 42	4 38	4 35	4 36	S.	
43	R.	6 02	6 05	6 08	6 11	6 14	6 17	6 20	6 23	6 26	6 29	6 32	6 36	6 39	6 43	6 46	6 50	6 53	6 57	7 01	7 05	7 10	7 15	7 20	7 26	7 31	R.	43
	S.	6 12	6 08	6 03	5 59	5 54	5 50	5 45	5 41	5 36	5 32	5 27	5 23	5 18	5 14	5 09	5 05	5 00	4 56	4 51	4 47	4 43	4 39	4 35	4 32	4 32	S.	
44	R.	6 02	6 05	6 08	6 11	6 14	6 18	6 21	6 24	6 27	6 31	6 34	6 37	6 41	6 44	6 48	6 52	6 55	6 59	7 04	7 08	7 13	7 18	7 23	7 30	7 35	R.	44
	S.	6 13	6 08	6 03	5 59	5 54	5 50	5 45	5 40	5 35	5 31	5 26	5 21	5 17	5 12	5 08	5 03	4 58	4 53	4 49	4 44	4 40	4 36	4 32	4 29	4 29	S.	
45	R.	6 02	6 05	6 08	6 12	6 15	6 18	6 21	6 24	6 28	6 32	6 35	6 39	6 42	6 46	6 50	6 54	6 58	7 02	7 06	7 11	7 16	7 21	7 27	7 33	7 38	R.	45
	S.	6 13	6 08	6 03	5 59	5 54	5 49	5 44	5 39	5 34	5 30	5 25	5 20	5 15	5 11	5 06	5 01	4 56	4 51	4 46	4 42	4 37	4 33	4 29	4 25	4 25	S.	
46	R.	6 02	6 05	6 08	6 12	6 15	6 19	6 22	6 25	6 29	6 33	6 36	6 40	6 44	6 48	6 52	6 56	7 00	7 04	7 09	7 14	7 19	7 24	7 30	7 37	7 42	R.	46
	S.	6 13	6 08	6 03	5 58	5 53	5 48	5 43	5 38	5 33	5 28	5 23	5 18	5 14	5 09	5 04	4 59	4 54	4 49	4 44	4 39	4 34	4 29	4 25	4 22	4 22	S.	
47	R.	6 02	6 05	6 09	6 12	6 16	6 19	6 23	6 26	6 30	6 34	6 38	6 42	6 46	6 50	6 54	6 58	7 02	7 07	7 12	7 17	7 22	7 28	7 34	7 41	7 46	R.	47
	S.	6 13	6 08	6 03	5 58	5 53	5 48	5 43	5 37	5 32	5 27	5 22	5 17	5 12	5 07	5 02	4 57	4 51	4 46	4 41	4 36	4 31	4 26	4 22	4 18	4 18	S.	
48	R.	6 02	6 05	6 09	6 13	6 16	6 20	6 24	6 27	6 31	6 35	6 39	6 43	6 47	6 52	6 56	7 00	7 05	7 10	7 15	7 20	7 25	7 31	7 38	7 45	7 50	R.	48
	S.	6 13	6 08	6 03	5 58	5 52	5 47	5 42	5 36	5 31	5 26	5 20	5 15	5 10	5 05	5 00	4 54	4 49	4 43	4 38	4 33	4 27	4 22	4 18	4 14	4 14	S.	
49	R.	6 01	6 05	6 09	6 13	6 17	6 21	6 24	6 28	6 33	6 37	6 41	6 45	6 49	6 54	6 58	7 03	7 08	7 13	7 18	7 23	7 29	7 35	7 42	7 49	7 54	R.	49
	S.	6 13	6 08	6 03	5 57	5 52	5 47	5 41	5 35	5 30	5 25	5 19	5 14	5 08	5 03	4 57	4 52	4 46	4 40	4 35	4 29	4 24	4 19	4 14	4 10	4 09	S.	
50	R.	6 01	6 05	6 09	6 13	6 17	6 21	6 25	6 29	6 34	6 38	6 42	6 47	6 51	6 56	7 01	7 05	7 10	7 15	7 21	7 27	7 33	7 39	7 46	7 53	7 59	R.	50
	S.	6 13	6 08	6 02	5 56	5 51	5 46	5 40	5 34	5 29	5 23	5 17	5 12	5 06	5 01	4 55	4 49	4 43	4 37	4 32	4 26	4 20	4 15	4 10	4 05	4 05	S.	
51	R.	6 01	6 06	6 10	6 14	6 18	6 22	6 26	6 31	6 35	6 40	6 44	6 48	6 53	6 58	7 03	7 08	7 13	7 18	7 24	7 30	7 36	7 43	7 50	7 58	8 04	R.	51
	S.	6 13	6 08	6 02	5 56	5 50	5 45	5 39	5 33	5 27	5 22	5 16	5 10	5 04	4 58	4 52	4 46	4 40	4 34	4 28	4 22	4 16	4 11	4 05	4 01	4 00	S,	
52	R.	6 01	6 06	6 10	6 14	6 19	6 23	6 27	6 32	6 36	6 41	6 45	6 50	6 55	7 00	7 06	7 11	7 16	7 22	7 28	7 34	7 40	7 47	7 55	8 03	8 09	R.	52
	S.	6 13	6 08	6 02	5 56	5 50	5 44	5 38	5 32	5 26	5 20	5 14	5 08	5 02	4 56	4 50	4 44	4 37	4 31	4 25	4 19	4 12	4 06	4 01	3 56	3 55	S.	
53	R.	6 01	6 06	6 10	6 15	6 19	6 24	6 28	6 33	6 38	6 43	6 47	6 52	6 58	7 03	7 08	7 14	7 19	7 25	7 31	7 38	7 45	7 52	8 00	8 08	8 14	R.	53
	S.	6 13	6 08	6 02	5 56	5 49	5 43	5 37	5 31	5 25	5 19	5 12	5 06	5 00	4 54	4 47	4 41	4 34	4 27	4 21	4 15	4 08	4 02	3 56	3 50	3 49	S.	
54	R.	6 01	6 06	6 10	6 15	6 20	6 25	6 29	6 34	6 39	6 44	6 49	6 54	7 00	7 05	7 11	7 17	7 23	7 29	7 35	7 42	7 49	7 57	8 05	8 14	8 20	R.	54
	S.	6 14	6 08	6 01	5 55	5 49	5 43	5 36	5 30	5 23	5 17	5 10	5 04	4 58	4 51	4 44	4 38	4 31	4 24	4 17	4 11	4 04	3 57	3 51	3 45	3 44	S.	
55	R.	6 01	6 06	6 11	6 16	6 21	6 26	6 31	6 36	6 41	6 46	6 51	6 57	7 02	7 08	7 14	7 20	7 26	7 32	7 39	7 46	7 54	8 02	8 10	8 19	8 26	R.	55
	S.	6 14	6 08	6 01	5 55	5 48	5 42	5 35	5 28	5 22	5 15	5 08	5 02	4 55	4 48	4 41	4 34	4 27	4 20	4 13	4 06	3 59	3 52	3 45	3 39	3 38	S.	
56	R.	6 01	6 06	6 11	6 16	6 21	6 27	6 32	6 37	6 42	6 48	6 53	6 59	7 05	7 11	7 17	7 24	7 30	7 37	7 44	7 51	7 59	8 07	8 16	8 26	8 33	R.	56
	S.	6 14	6 08	6 01	5 54	5 47	5 41	5 34	5 27	5 20	5 13	5 06	4 59	4 52	4 45	4 38	4 31	4 24	4 16	4 09	4 01	3 54	3 46	3 39	3 33	3 31	S.	
57	R.	6 00	6 06	6 11	6 17	6 22	6 28	6 33	6 38	6 44	6 50	6 56	7 02	7 08	7 14	7 21	7 27	7 34	7 41	7 48	7 56	8 04	8 13	8 22	8 33	8 40	R.	57
	S.	6 14	6 08	6 01	5 54	5 47	5 40	5 32	5 25	5 18	5 11	5 04	4 57	4 50	4 42	4 35	4 27	4 20	4 12	4 04	3 56	3 48	3 41	3 33	3 26	3 24	S.	
58	R.	6 00	6 06	6 11	6 17	6 23	6 29	6 34	6 40	6 46	6 52	6 58	7 04	7 11	7 17	7 24	7 31	7 38	7 45	7 53	8 01	8 10	8 19	8 29	8 40	8 47	R.	58
	S.	6 14	6 07	6 00	5 53	5 46	5 39	5 31	5 24	5 17	5 09	5 02	4 54	4 47	4 39	4 31	4 23	4 15	4 07	3 59	3 51	3 43	3 34	3 26	3 19	3 16	S.	
59	R.	6 00	6 06	6 12	6 18	6 24	6 30	6 36	6 42	6 48	6 54	7 00	7 07	7 14	7 21	7 28	7 35	7 42	7 50	7 58	8 07	8 16	8 26	8 37	8 48	8 55	R.	59
	S.	6 15	6 07	6 00	5 53	5 45	5 38	5 30	5 22	5 15	5 07	4 59	4 52	4 44	4 36	4 28	4 20	4 11	4 02	3 54	3 46	3 37	3 28	3 19	3 11	3 08	S.	
60	R.	6 00	6 06	6 12	6 19	6 25	6 31	6 37	6 43	6 50	6 57	7 03	7 10	7 17	7 24	7 32	7 39	7 47	7 55	8 04	8 13	8 23	8 33	8 45	8 57	9 04	R.	60
	S.	6 15	6 07	5 59	5 52	5 44	5 36	5 28	5 20	5 13	5 05	4 57	4 49	4 41	4 32	4 24	4 15	4 06	3 57	3 48	3 39	3 30	3 21	3 11	3 02	2 59	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

South Latitude: 0° to 20°.—June 22 to September 23.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. S.	Approx. date.	JUNE.	JULY.					AUGUST.										SEPTEMBER.									Approx. date.	Lat. S.
		22	3	12	19	24	28	2	5	9	12	16	19	22	25	28	30	2	5	8	10	13	16	18	21	23		
	Dec. N.	23° 27′	23°	22°	21°	20°	19°	18°	17°	16°	15°	14°	13°	12°	11°	10°	9°	8°	7°	6°	5°	4°	3°	2°	1°	0°	Dec. N.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
0	R.	5 57	6 00	6 01	6 02	6 02	6 02	6 02	6 02	6 01	6 01	6 00	6 00	5 59	5 58	5 57	5 57	5 56	5 55	5 54	5 53	5 52	5 51	5 50	5 49	5 49	R.	0
	S.	6 05	6 08	6 09	6 10	6 10	6 10	6 10	6 10	6 09	6 09	6 08	6 08	6 07	6 06	6 05	6 05	6 04	6 03	6 02	6 01	6 00	5 59	5 58	5 57	5 56	S.	
1	R.	5 59	6 01	6 02	6 03	6 04	6 04	6 04	6 03	6 03	6 02	6 01	6 01	6 00	5 59	5 58	5 57	5 56	5 55	5 54	5 54	5 53	5 52	5 51	5 50	5 49	R.	1
	S.	6 04	6 06	6 07	6 08	6 09	6 09	6 09	6 08	6 08	6 08	6 07	6 07	6 06	6 05	6 04	6 04	6 03	6 02	6 01	6 01	6 00	5 59	5 58	5 57	5 56	S.	
2	R.	6 01	6 03	6 04	6 05	6 05	6 05	6 05	6 04	6 04	6 03	6 02	6 01	6 00	6 00	5 59	5 58	5 57	5 56	5 55	5 54	5 53	5 52	5 51	5 50	5 49	R.	2
	S.	6 03	6 05	6 06	6 07	6 07	6 08	6 08	6 07	6 07	6 07	6 06	6 06	6 05	6 05	6 04	6 03	6 02	6 02	6 01	6 01	6 00	5 59	5 58	5 57	5 56	S.	
3	R.	6 03	6 05	6 06	6 06	6 07	6 06	6 06	6 05	6 05	6 04	6 03	6 02	6 01	6 00	5 59	5 58	5 57	5 56	5 55	5 54	5 53	5 52	5 51	5 50	5 49	R.	3
	S.	6 01	6 03	6 05	6 05	6 06	6 06	6 06	6 06	6 06	6 06	6 05	6 05	6 04	6 04	6 03	6 03	6 02	6 01	6 00	6 00	5 59	5 59	5 58	5 57	5 56	S.	
4	R.	6 04	6 06	6 07	6 08	6 08	6 08	6 07	6 06	6 06	6 05	6 04	6 03	6 02	6 01	6 00	5 59	5 58	5 57	5 55	5 54	5 53	5 52	5 51	5 50	5 49	R.	4
	S.	5 59	6 02	6 03	6 04	6 04	6 05	6 05	6 05	6 05	6 05	6 04	6 04	6 03	6 03	6 03	6 02	6 01	6 01	6 00	6 00	5 59	5 58	5 58	5 57	5 56	S.	
5	R.	6 06	6 08	6 09	6 09	6 10	6 09	6 09	6 08	6 07	6 06	6 05	6 04	6 03	6 02	6 01	6 00	5 59	5 57	5 56	5 55	5 54	5 52	5 51	5 50	5 49	R.	5
	S.	5 57	6 00	6 01	6 02	6 03	6 03	6 04	6 04	6 03	6 03	6 03	6 03	6 02	6 02	6 02	6 02	6 01	6 00	6 00	6 00	5 59	5 58	5 58	5 57	5 56	S.	
6	R.	6 08	6 10	6 11	6 11	6 11	6 10	6 10	6 09	6 08	6 07	6 06	6 05	6 04	6 03	6 01	6 00	5 59	5 58	5 56	5 55	5 54	5 52	5 51	5 50	5 48	R.	6
	S.	5 56	5 58	6 00	6 01	6 02	6 02	6 03	6 03	6 02	6 02	6 02	6 02	6 02	6 02	6 01	6 01	6 00	6 00	5 59	5 59	5 59	5 58	5 58	5 57	6 56	S.	
7	R.	6 10	6 11	6 12	6 12	6 12	6 12	6 11	6 10	6 09	6 08	6 07	6 06	6 05	6 04	6 02	6 01	6 00	5 58	5 57	5 56	5 54	5 53	5 51	5 50	5 48	R.	7
	S.	5 54	5 56	5 58	5 59	6 00	6 01	6 01	6 01	6 01	6 01	6 01	6 01	6 01	6 01	6 00	6 00	6 00	5 59	5 59	5 59	5 58	5 58	5 57	5 57	5 56	S.	
8	R.	6 11	6 13	6 14	6 14	6 14	6 13	6 12	6 11	6 10	6 09	6 08	6 07	6 06	6 04	6 03	6 02	6 00	5 59	5 57	5 56	5 54	5 53	5 51	5 50	5 48	R.	8
	S.	5 52	5 55	5 57	5 58	5 59	6 00	6 00	6 00	6 00	6 00	6 00	6 00	6 00	6 00	6 00	6 00	5 59	5 59	5 59	5 59	5 58	5 58	5 57	5 57	5 56	S.	
9	R.	6 13	6 15	6 16	6 15	6 15	6 14	6 14	6 13	6 12	6 10	6 09	6 08	6 07	6 05	6 04	6 03	6 01	5 59	5 57	5 56	5 55	5 53	5 51	5 50	5 48	R.	9
	S.	5 50	5 53	5 55	5 56	5 57	5 58	5 59	5 59	5 59	5 59	5 59	5 59	5 59	5 59	5 59	5 59	5 58	5 58	5 58	5 58	5 58	5 58	5 57	5 57	5 56	S.	
10	R.	6 15	6 16	6 17	6 17	6 17	6 16	6 15	6 14	6 13	6 11	6 10	6 09	6 07	6 06	6 04	6 03	6 02	6 00	5 58	5 56	5 55	5 53	5 51	5 50	5 48	R.	10
	S.	5 49	5 51	5 53	5 55	5 56	5 57	5 58	5 58	5 58	5 58	5 58	5 59	5 58	5 58	5 58	5 58	5 58	5 58	5 58	5 58	5 58	5 58	5 57	5 57	5 56	S.	
11	R.	6 17	6 18	6 19	6 18	6 18	6 17	6 16	6 15	6 14	6 12	6 11	6 10	6 08	6 07	6 05	6 04	6 02	6 00	5 58	5 57	5 55	5 53	5 52	5 50	5 48	R.	11
	S.	5 47	5 49	5 52	5 53	5 54	5 55	5 56	5 57	5 57	5 57	5 57	5 58	5 57	5 57	5 57	5 57	5 57	5 57	5 57	5 57	5 57	5 57	5 57	5 57	5 56	S.	
12	R.	6 18	6 20	6 20	6 20	6 20	6 19	6 18	6 16	6 15	6 13	6 12	6 11	6 09	6 08	6 06	6 04	6 03	6 01	5 59	5 58	5 56	5 54	5 52	5 50	5 48	R.	12
	S.	5 45	5 48	5 50	5 52	5 53	5 54	5 55	5 55	5 56	5 56	5 56	5 57	5 57	5 57	5 57	5 57	5 57	5 57	5 57	5 57	5 57	5 57	5 57	5 57	5 56	S.	
13	R.	6 20	6 22	6 22	6 22	6 21	6 20	6 19	6 18	6 16	6 15	6 13	6 12	6 10	6 09	6 07	6 05	6 03	6 01	5 59	5 58	5 56	5 54	5 52	5 50	5 48	R.	13
	S.	5 43	5 46	5 48	5 50	5 51	5 52	5 53	5 54	5 54	5 55	5 55	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 56	S.	
14	R.	6 22	6 23	6 24	6 23	6 23	6 22	6 20	6 19	6 17	6 16	6 14	6 13	6 11	6 09	6 07	6 06	6 04	6 02	6 00	5 58	5 56	5 54	5 52	5 50	5 48	R.	14
	S.	5 42	5 44	5 46	5 48	5 50	5 51	5 52	5 53	5 53	5 54	5 54	5 55	5 55	5 55	5 55	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 56	S.	
15	R.	6 24	6 25	6 26	6 25	6 24	6 23	6 22	6 20	6 19	6 17	6 15	6 14	6 12	6 10	6 08	6 06	6 04	6 02	6 00	5 58	5 56	5 54	5 52	5 50	5 48	R.	15
	S.	5 40	5 42	5 45	5 47	5 48	5 49	5 50	5 51	5 52	5 53	5 53	5 54	5 54	5 55	5 55	5 55	5 55	5 55	5 55	5 56	5 56	5 56	5 56	5 56	5 56	S.	
16	R.	6 26	6 27	6 27	6 26	6 26	6 25	6 23	6 22	6 20	6 18	6 16	6 15	6 13	6 11	6 09	6 07	6 05	6 03	6 01	5 59	5 57	5 55	5 52	5 50	5 48	R.	16
	S.	5 38	5 40	5 43	5 45	5 47	5 48	5 49	5 50	5 51	5 52	5 52	5 53	5 53	5 54	5 54	5 55	5 55	5 55	5 55	5 56	5 56	5 56	5 56	5 56	5 56	S.	
17	R.	6 28	6 29	6 29	6 28	6 28	6 26	6 25	6 23	6 21	6 19	6 18	6 16	6 14	6 12	6 10	6 08	6 06	6 03	6 01	5 59	5 57	5 55	5 53	5 50	5 48	R.	17
	S.	5 36	5 38	5 41	5 43	5 45	5 46	5 47	5 48	5 49	5 50	5 51	5 52	5 52	5 53	5 53	5 54	5 54	5 54	5 54	5 55	5 55	5 56	5 56	5 56	5 56	S.	
18	R.	6 30	6 31	6 31	6 30	6 29	6 28	6 26	6 24	6 22	6 20	6 19	6 17	6 15	6 13	6 10	6 08	6 06	6 04	6 01	5 59	5 57	5 55	5 53	5 50	5 48	R.	18
	S.	5 34	5 37	5 40	5 42	5 43	5 45	5 46	5 47	5 48	5 49	5 50	5 51	5 51	5 52	5 52	5 53	5 53	5 54	5 54	5 55	5 55	5 56	5 56	5 56	5 56	S.	
19	R.	6 32	6 33	6 33	6 32	6 31	6 29	6 28	6 26	6 24	6 22	6 20	6 18	6 16	6 14	6 11	6 09	6 07	6 04	6 02	6 00	5 58	5 55	5 53	5 50	5 48	R.	19
	S.	5 32	5 35	5 38	5 40	5 42	5 43	5 45	5 46	5 47	5 48	5 49	5 50	5 50	5 51	5 51	5 52	5 53	5 53	5 54	5 55	5 55	5 55	5 56	5 56	5 56	S.	
20	R.	6 34	6 35	6 35	6 33	6 32	6 31	6 29	6 27	6 25	6 23	6 21	6 19	6 16	6 14	6 12	6 10	6 07	6 05	6 02	6 00	5 58	5 55	5 53	5 50	5 48	R.	20
	S.	5 30	5 33	5 36	5 38	5 40	5 42	5 43	5 45	5 46	5 47	5 48	5 49	5 49	5 50	5 51	5 52	5 52	5 53	5 53	5 54	5 55	5 55	5 56	5 56	5 56	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

South Latitude: 21° to 40°—June 22 to September 23.

[R = Local mean time of sun's visible rising. S = Local mean time of sun's visible setting.]

Lat. S.	Approx. date.	JUNE.	JULY.					AUGUST.										SEPTEMBER.									Approx. date.	Lat. S.
		22	3	12	19	24	28	2	5	9	12	16	19	22	25	28	30	2	5	8	10	13	16	18	21	23		
	Dec. N.	23° 27′	23°	22°	21°	20°	19°	18°	17°	16°	15°	14°	13°	12°	11°	10°	9°	8°	7°	6°	5°	4°	3°	2°	1°	0°	Dec. N.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
21	R.	6 36	6 37	6 37	6 35	6 34	6 32	6 30	6 28	6 26	6 24	6 22	6 20	6 17	6 15	6 13	6 11	6 08	6 05	6 03	6 01	5 58	5 56	5 53	5 51	5 48	R.	21
	S.	5 28	5 31	5 34	5 36	5 38	5 40	5 42	5 43	5 44	5 46	5 47	5 48	5 48	5 49	5 50	5 51	5 51	5 52	5 53	5 54	5 54	5 55	5 55	5 56	5 56	S.	
22	R.	6 38	6 39	6 38	6 37	6 36	6 34	6 32	6 30	6 27	6 25	6 23	6 21	6 18	6 16	6 13	6 11	6 09	6 06	6 03	6 01	5 58	5 56	5 53	5 51	5 48	R.	22
	S.	5 26	5 29	5 32	5 35	5 37	5 39	5 40	5 42	5 43	5 45	5 46	5 47	5 47	5 48	5 49	5 50	5 51	5 52	5 52	5 53	5 54	5 55	5 55	5 56	5 56	S.	
23	R.	6 40	6 41	6 40	6 39	6 37	6 35	6 33	6 31	6 29	6 26	6 24	6 22	6 19	6 17	6 14	6 12	6 09	6 06	6 04	6 02	5 59	5 56	5 53	5 51	5 48	R.	23
	S.	5 24	5 27	5 30	5 33	5 35	5 37	5 39	5 40	5 42	5 43	5 45	5 46	5 46	5 47	5 48	5 49	5 50	5 51	5 52	5 53	5 54	5 55	5 55	5 56	5 56	S.	
24	R.	6 42	6 43	6 42	6 40	6 39	6 37	6 35	6 33	6 30	6 28	6 25	6 23	6 20	6 18	6 15	6 13	6 10	6 07	6 04	6 02	5 59	5 56	5 53	5 51	5 48	R.	24
	S.	5 22	5 25	5 28	5 31	5 34	5 36	5 37	5 39	5 40	5 42	5 43	5 44	5 45	5 46	5 48	5 49	5 50	5 51	5 51	5 52	5 53	5 54	5 55	5 56	5 56	S	
25	R.	6 44	6 45	6 44	6 42	6 41	6 39	6 37	6 34	6 32	6 29	6 27	6 24	6 21	6 19	6 16	6 13	6 11	6 08	6 05	6 02	6 00	5 57	5 54	5 51	5 48	R.	25
	S.	5 20	5 23	5 26	5 29	5 32	5 34	5 36	5 37	5 39	5 40	5 42	5 43	5 44	5 46	5 47	5 48	5 49	5 50	5 51	5 52	5 53	5 54	5 55	5 56	5 56	S.	
26	R.	6 46	6 47	6 46	6 44	6 42	6 40	6 38	6 35	6 33	6 30	6 28	6 25	6 22	6 19	6 16	6 14	6 11	6 08	6 05	6 03	6 00	5 57	5 54	5 51	5 48	R.	26
	S.	5 18	5 21	5 24	5 27	5 30	5 32	5 34	5 36	5 38	5 39	5 41	5 42	5 43	5 45	5 46	5 47	5 48	5 49	5 50	5 52	5 53	5 54	5 55	5 56	5 56	S.	
27	R.	6 48	6 49	6 48	6 46	6 44	6 42	6 40	6 37	6 34	6 31	6 29	6 26	6 23	6 20	6 17	6 15	6 12	6 09	6 06	6 03	6 00	5 57	5 54	5 51	5 48	R.	27
	S.	5 15	5 18	5 22	5 25	5 28	5 31	5 33	5 35	5 36	5 38	5 40	5 41	5 42	5 44	5 45	5 47	5 48	5 49	5 50	5 51	5 52	5 54	5 55	5 56	5 57	S.	
28	R.	6 50	6 51	6 50	6 48	6 46	6 44	6 41	6 38	6 36	6 33	6 30	6 27	6 24	6 21	6 18	6 15	6 12	6 09	6 06	6 03	6 00	5 57	5 54	5 51	5 48	R.	28
	S.	5 13	5 16	5 20	5 23	5 26	5 29	5 31	5 33	5 35	5 37	5 39	5 40	5 41	5 43	5 44	5 46	5 47	5 48	5 49	5 51	5 52	5 53	5 54	5 56	5 57	S.	
29	R.	6 53	6 53	6 52	6 50	6 48	6 46	6 43	6 40	6 37	6 34	6 31	6 28	6 25	6 22	6 19	6 16	6 13	6 10	6 07	6 04	6 01	5 57	5 54	5 51	5 48	R.	29
	S.	5 11	5 14	5 18	5 21	5 24	5 27	5 29	5 31	5 33	5 35	5 37	5 39	5 40	5 42	5 43	5 45	5 46	5 48	5 49	5 51	5 52	5 53	5 54	5 56	5 57	S.	
30	R.	6 55	6 55	6 54	6 52	6 50	6 47	6 45	6 42	6 39	6 36	6 33	6 30	6 26	6 23	6 20	6 17	6 14	6 10	6 07	6 04	6 01	5 57	5 54	5 51	5 48	R.	30
	S.	5 09	5 12	5 16	5 19	5 22	5 25	5 28	5 30	5 32	5 34	5 36	5 38	5 39	5 41	5 43	5 45	5 46	5 47	5 48	5 50	5 52	5 53	5 54	5 56	5 57	S.	
31	R.	6 57	6 58	6 57	6 54	6 52	6 49	6 46	6 43	6 40	6 37	6 34	6 31	6 27	6 24	6 21	6 18	6 15	6 11	6 08	6 05	6 01	5 58	5 54	5 51	5 48	R.	31
	S.	5 06	5 10	5 14	5 17	5 20	5 23	5 26	5 28	5 30	5 32	5 34	5 36	5 38	5 40	5 42	5 44	5 45	5 46	5 48	5 50	5 51	5 53	5 54	5 56	5 57	S.	
32	R.	7 00	7 00	6 59	6 56	6 54	6 51	6 48	6 45	6 42	6 38	6 35	6 32	6 28	6 25	6 22	6 19	6 15	6 12	6 08	6 05	6 02	5 58	5 54	5 51	5 48	R.	32
	S.	5 04	5 07	5 12	5 15	5 18	5 21	5 24	5 27	5 29	5 31	5 33	5 35	5 37	5 39	5 41	5 43	5 44	5 46	5 47	5 49	5 51	5 53	5 54	5 56	5 57	S.	
33	R.	7 02	7 03	7 01	6 59	6 56	6 53	6 50	6 47	6 43	6 40	6 37	6 33	6 30	6 26	6 23	6 20	6 16	6 12	6 09	6 06	6 02	5 58	5 55	5 51	5 48	R.	33
	S.	5 01	5 05	5 09	5 13	5 16	5 19	5 22	5 25	5 27	5 30	5 32	5 34	5 36	5 38	5 40	5 42	5 43	5 45	5 47	5 49	5 50	5 52	5 54	5 55	5 57	S.	
34	R.	7 05	7 05	7 03	7 01	6 58	6 55	6 52	6 48	6 45	6 41	6 38	6 35	6 31	6 27	6 24	6 20	6 17	6 13	6 09	6 06	6 02	5 58	5 55	5 51	5 48	R.	34
	S.	4 59	5 02	5 07	5 11	5 14	5 18	5 21	5 23	5 26	5 28	5 30	5 33	5 35	5 37	5 39	5 41	5 43	5 45	5 46	5 48	5 50	5 52	5 54	5 55	5 57	S.	
35	R.	7 07	7 08	7 06	7 03	7 00	6 57	6 54	6 50	6 47	6 43	6 40	6 36	6 32	6 29	6 25	6 21	6 18	6 14	6 10	6 07	6 03	5 59	5 55	5 51	5 48	R.	35
	S.	4 56	5 00	5 05	5 09	5 12	5 16	5 19	5 21	5 24	5 26	5 29	5 31	5 33	5 36	5 38	5 40	5 42	5 44	5 46	5 48	5 50	5 52	5 53	5 55	5 57	S.	
36	R.	7 10	7 10	7 08	7 05	7 02	6 59	6 56	6 52	6 48	6 45	6 41	6 37	6 33	6 30	6 26	6 22	6 18	6 14	6 10	6 07	6 03	5 59	5 55	5 51	5 48	R.	36
	S.	4 54	4 57	5 02	5 06	5 10	5 14	5 17	5 20	5 22	5 25	5 27	5 30	5 32	5 35	5 37	5 39	5 41	5 43	5 45	5 47	5 49	5 51	5 53	5 55	5 57	S.	
37	R.	7 13	7 13	7 11	7 08	7 05	7 01	6 58	6 54	6 50	6 46	6 43	6 39	6 35	6 31	6 27	6 23	6 19	6 15	6 11	6 08	6 04	6 00	5 56	5 52	5 48	R.	37
	S.	4 51	4 55	5 00	5 04	5 08	5 11	5 15	5 18	5 20	5 23	5 26	5 29	5 31	5 34	5 36	5 38	5 40	5 42	5 44	5 47	5 49	5 51	5 53	5 55	5 57	S.	
38	R.	7 16	7 16	7 13	7 10	7 07	7 03	7 00	6 56	6 52	6 48	6 44	6 40	6 36	6 32	6 28	6 24	6 20	6 16	6 12	6 08	6 04	6 00	5 56	5 52	5 47	R.	38
	S.	4 48	4 52	4 57	5 01	5 05	5 09	5 13	5 16	5 19	5 22	5 24	5 27	5 30	5 33	5 35	5 37	5 40	5 42	5 44	5 46	5 49	5 51	5 53	5 55	5 57	S.	
39	R.	7 19	7 19	7 16	7 13	7 10	7 06	7 02	6 58	6 54	6 50	6 46	6 42	6 37	6 33	6 29	6 25	6 21	6 17	6 13	6 09	6 04	6 00	5 56	5 52	5 47	R.	39
	S.	4 45	4 49	4 54	4 59	5 03	5 07	5 10	5 14	5 17	5 20	5 23	5 26	5 28	5 31	5 34	5 36	5 39	5 41	5 43	5 46	5 48	5 51	5 53	5 55	5 57	S.	
40	R.	7 22	7 22	7 19	7 15	7 12	7 08	7 04	7 00	6 56	6 51	6 47	6 43	6 39	6 34	6 30	6 26	6 22	6 18	6 13	6 09	6 05	6 00	5 56	5 52	5 47	R.	40
	S.	4 42	4 46	4 52	4 56	5 00	5 04	5 08	5 12	5 15	5 18	5 21	5 24	5 27	5 30	5 33	5 35	5 38	5 40	5 42	5 45	5 48	5 50	5 53	5 55	5 57	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

South Latitude: 41° to 60°—June 22 to September 23.

[R = Local mean time of sun's visible rising. S = Local mean time of sun's visible setting.]

Lat. S.	Approx. date.	JUNE.	JULY.					AUGUST.										SEPTEMBER.									Approx. date.	Lat. S.
		22	3	12	19	24	28	2	5	9	12	16	19	22	25	28	30	2	5	8	10	13	16	18	21	23		
	Dec. N.	23° 27′	23°	22°	21°	20°	19°	18°	17°	16°	15°	14°	13°	12°	11°	10°	9°	8°	7°	6°	5°	4°	3°	2°	1°	0°	Dec. N.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
41	R.	7 25	7 25	7 22	7 18	7 15	7 11	7 07	7 02	6 58	6 53	6 49	6 45	6 40	6 36	6 31	6 27	6 23	6 18	6 14	6 10	6 05	6 01	5 56	5 52	5 47	R.	41
	S.	4 39	4 43	4 49	4 53	4 58	5 02	5 06	5 09	5 13	5 16	5 19	5 22	5 25	5 28	5 31	5 34	5 37	5 39	5 42	5 45	5 47	5 50	5 52	5 55	5 57	S.	
42	R.	7 28	7 28	7 25	7 21	7 17	7 13	7 09	7 04	7 00	6 55	6 51	6 46	6 42	6 37	6 32	6 28	6 24	6 19	6 14	6 10	6 06	6 01	5 56	5 52	5 47	R.	42
	S.	4 36	4 40	4 46	4 51	4 55	5 00	5 04	5 07	5 11	5 14	5 18	5 21	5 24	5 27	5 30	5 33	5 36	5 39	5 41	5 44	5 47	5 50	5 52	5 55	5 57	S.	
43	R.	7 31	7 31	7 28	7 24	7 20	7 15	7 11	7 06	7 02	6 57	6 53	6 48	6 43	6 39	6 34	6 29	6 25	6 20	6 15	6 11	6 06	6 01	5 57	5 52	5 47	R.	43
	S.	4 32	4 37	4 43	4 48	4 53	4 57	5 01	5 05	5 09	5 12	5 16	5 19	5 22	5 26	5 29	5 32	5 35	5 38	5 41	5 44	5 46	5 49	5 52	5 55	5 57	S.	
44	R.	7 35	7 34	7 31	7 27	7 23	7 18	7 14	7 09	7 04	6 59	6 54	6 50	6 45	6 40	6 35	6 31	6 26	6 21	6 16	6 11	6 06	6 01	5 57	5 52	5 47	R.	44
	S.	4 29	4 33	4 40	4 45	4 50	4 54	4 59	5 03	5 07	5 10	5 14	5 18	5 21	5 24	5 27	5 31	5 34	5 37	5 40	5 43	5 46	5 49	5 52	5 55	5 58	S.	
45	R.	7 38	7 38	7 34	7 30	7 26	7 21	7 16	7 11	7 06	7 01	6 56	6 51	6 46	6 41	6 36	6 32	6 27	6 22	6 17	6 12	6 07	6 02	5 57	5 52	5 47	R.	45
	S.	4 25	4 30	4 36	4 42	4 47	4 52	4 56	5 00	5 04	5 08	5 12	5 16	5 19	5 23	5 26	5 30	5 33	5 36	5 39	5 43	5 46	5 49	5 52	5 55	5 58	S.	
46	R.	7 42	7 41	7 38	7 33	7 29	7 24	7 19	7 14	7 08	7 03	6 58	6 53	6 48	6 43	6 38	6 33	6 28	6 22	6 17	6 12	6 07	6 02	5 57	5 52	5 47	R.	46
	S.	4 22	4 26	4 33	4 38	4 44	4 49	4 54	4 58	5 02	5 06	5 10	5 14	5 18	5 21	5 25	5 29	5 32	5 35	5 38	5 42	5 45	5 49	5 52	5 55	5 58	S.	
47	R.	7 46	7 45	7 41	7 37	7 32	7 27	7 22	7 16	7 11	7 05	7 00	6 55	6 50	6 45	6 39	6 34	6 29	6 23	6 18	6 13	6 08	6 02	5 57	5 52	5 47	R.	47
	S.	4 18	4 22	4 29	4 35	4 41	4 46	4 51	4 55	5 00	5 04	5 08	5 12	5 16	5 20	5 23	5 27	5 31	5 34	5 38	5 42	5 45	5 48	5 51	5 55	5 58	S.	
48	R.	7 50	7 49	7 45	7 40	7 35	7 30	7 25	7 19	7 13	7 08	7 02	6 57	6 51	6 46	6 41	6 35	6 30	6 24	6 19	6 14	6 08	6 03	5 57	5 52	5 47	R.	48
	S.	4 14	4 18	4 25	4 31	4 37	4 43	4 48	4 53	4 57	5 02	5 06	5 10	5 14	5 18	5 22	5 26	5 30	5 33	5 37	5 41	5 44	5 48	5 51	5 55	5 58	S.	
49	R.	7 54	7 53	7 49	7 44	7 39	7 33	7 28	7 22	7 16	7 10	7 05	6 59	6 53	6 48	6 42	6 37	6 31	6 25	6 19	6 14	6 09	6 03	5 57	5 52	5 47	R.	49
	S.	4 09	4 14	4 21	4 28	4 34	4 39	4 45	4 50	4 54	4 59	5 04	5 08	5 12	5 17	5 21	5 25	5 28	5 32	5 36	5 40	5 44	5 47	5 51	5 55	5 58	S.	
50	R.	7 59	7 58	7 53	7 48	7 43	7 37	7 31	7 25	7 19	7 13	7 07	7 01	6 55	6 50	6 44	6 38	6 32	6 26	6 20	6 15	6 09	6 04	5 58	5 52	5 46	R.	50
	S.	4 05	4 10	4 17	4 24	4 30	4 36	4 42	4 47	4 52	4 57	5 01	5 06	5 10	5 15	5 19	5 23	5 27	5 31	5 35	5 39	5 43	5 47	5 51	5 55	5 58	S.	
51	R.	8 04	8 02	7 58	7 52	7 46	7 40	7 34	7 28	7 22	7 16	7 10	7 04	6 57	6 51	6 45	6 39	6 33	6 27	6 21	6 16	6 10	6 04	5 58	5 52	5 46	R.	51
	S.	4 00	4 05	4 13	4 20	4 26	4 32	4 38	4 44	4 49	4 54	4 59	5 04	5 08	5 13	5 17	5 22	5 26	5 30	5 34	5 38	5 42	5 46	5 50	5 54	5 58	S.	
52	R.	8 09	8 07	8 02	7 56	7 50	7 44	7 38	7 31	7 25	7 18	7 12	7 06	6 59	6 53	6 47	6 41	6 35	6 29	6 23	6 17	6 11	6 04	5 58	5 52	5 46	R.	52
	S.	3 55	4 00	4 08	4 15	4 22	4 28	4 34	4 40	4 46	4 51	4 56	5 01	5 06	5 11	5 16	5 20	5 25	5 29	5 33	5 38	5 42	5 46	5 50	5 54	5 58	S.	
53	R.	8 14	8 13	8 07	8 01	7 54	7 48	7 41	7 35	7 28	7 21	7 15	7 08	7 02	6 55	6 49	6 43	6 36	6 30	6 24	6 18	6 11	6 05	5 59	5 52	5 46	R.	53
	S.	3 49	3 55	4 03	4 11	4 18	4 25	4 31	4 37	4 43	4 48	4 54	4 59	5 04	5 09	5 14	5 19	5 23	5 28	5 32	5 37	5 41	5 46	5 50	5 54	5 58	S.	
54	R.	8 20	8 18	8 12	8 06	7 59	7 52	7 45	7 38	7 31	7 24	7 18	7 11	7 04	6 57	6 51	6 44	6 38	6 31	6 25	6 18	6 12	6 05	5 59	5 52	5 46	R.	54
	S.	3 44	3 49	3 58	4 06	4 14	4 21	4 27	4 33	4 39	4 45	4 51	4 57	5 02	5 07	5 12	5 17	5 22	5 27	5 31	5 36	5 41	5 45	5 50	5 54	5 59	S.	
55	R.	8 26	8 24	8 18	8 11	8 04	7 56	7 49	7 42	7 35	7 28	7 21	7 14	7 07	7 00	6 53	6 46	6 39	6 32	6 26	6 19	6 13	6 06	5 59	5 52	5 46	R.	55
	S.	3 38	3 44	3 53	4 01	4 09	4 16	4 23	4 30	4 36	4 42	4 48	4 54	4 59	5 05	5 10	5 15	5 20	5 25	5 30	5 35	5 40	5 45	5 50	5 54	5 59	S.	
56	R.	8 33	8 30	8 24	8 16	8 09	8 01	7 54	7 46	7 38	7 31	7 24	7 17	7 09	7 02	6 55	6 48	6 41	6 34	6 27	6 20	6 13	6 06	5 59	5 52	5 45	R.	56
	S.	3 31	3 37	3 47	3 55	4 03	4 11	4 19	4 26	4 32	4 39	4 45	4 51	4 56	5 02	5 08	5 13	5 19	5 24	5 29	5 34	5 39	5 44	5 49	5 54	5 59	S.	
57	R.	8 40	8 37	8 30	8 22	8 14	8 06	7 58	7 50	7 42	7 35	7 27	7 20	7 12	7 05	6 57	6 50	6 43	6 35	6 28	6 21	6 14	6 07	6 00	5 52	5 45	R.	57
	S.	3 24	3 30	3 41	3 50	3 58	4 06	4 14	4 21	4 28	4 35	4 41	4 48	4 54	5 00	5 05	5 11	5 17	5 22	5 27	5 33	5 38	5 44	5 49	5 54	5 59	S.	
58	R.	8 47	8 44	8 37	8 28	8 20	8 11	8 03	7 55	7 46	7 38	7 31	7 23	7 15	7 07	6 59	6 52	6 44	6 37	6 29	6 22	6 15	6 07	6 00	5 52	5 45	R.	58
	S.	3 16	3 23	3 34	3 43	3 52	4 01	4 09	4 17	4 24	4 31	4 38	4 45	4 51	4 57	5 03	5 09	5 15	5 21	5 26	5 32	5 38	5 43	5 49	5 54	5 59	S.	
59	R.	8 55	8 52	8 44	8 35	8 26	8 17	8 08	8 00	7 51	7 42	7 34	7 26	7 18	7 10	7 02	6 54	6 46	6 38	6 31	6 23	6 16	6 08	6 00	5 52	5 45	R.	59
	S.	3 08	3 15	3 27	3 37	3 47	3 56	4 04	4 12	4 20	4 27	4 34	4 41	4 48	4 55	5 01	5 07	5 13	5 19	5 25	5 31	5 37	5 43	5 48	5 54	6 00	S.	
60	R.	9 04	9 01	8 52	8 42	8 33	8 23	8 14	8 05	7 56	7 47	7 38	7 30	7 21	7 13	7 04	6 56	6 48	6 40	6 32	6 25	6 17	6 09	6 01	5 53	5 45	R.	60
	S.	2 59	3 06	3 19	3 30	3 40	3 49	3 58	4 07	4 15	4 23	4 30	4 38	4 45	4 52	4 58	5 05	5 11	5 17	5 23	5 30	5 36	5 42	5 48	5 54	6 00	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

South latitude: 0° to 20°—September 23 to December 22.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. S.	Approx. date	SEPTEMBER.			OCTOBER.												NOVEMBER.							DECEMBER.			Approx. date	Lat. S.
		23	26	28	1	4	6	9	11	14	17	19	22	25	28	31	3	6	10	14	17	22	27	3	11	22		
	Dec. S.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	23° 27′	Dec. S.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
0	R.	5 49	5 48	5 47	5 46	5 45	5 44	5 44	5 43	5 42	5 42	5 41	5 41	5 40	5 40	5 40	5 40	5 40	5 40	5 40	5 41	5 42	5 44	5 46	5 49	5 54	R.	0
	S.	5 56	5 55	5 55	5 54	5 53	5 52	5 52	5 51	5 50	5 50	5 49	5 49	5 48	5 48	5 48	5 48	5 48	5 48	5 48	5 49	5 50	5 52	5 54	5 57	6 02	S.	
1	R.	5 49	5 48	5 47	5 46	5 45	5 44	5 44	5 43	5 42	5 41	5 41	5 40	5 40	5 39	5 39	5 39	5 39	5 39	5 39	5 40	5 41	5 42	5 44	5 48	5 53	R.	1
	S.	5 56	5 55	5 55	5 54	5 53	5 52	5 52	5 51	5 50	5 50	5 50	5 49	5 49	5 49	5 49	5 49	5 49	5 49	5 50	5 51	5 52	5 53	5 55	5 59	6 04	S.	
2	R.	5 49	5 48	5 47	5 46	5 45	5 44	5 44	5 43	5 42	5 41	5 40	5 40	5 39	5 38	5 38	5 38	5 38	5 38	5 38	5 39	5 40	5 41	5 43	5 46	5 51	R.	2
	S.	5 56	5 55	5 55	5 54	5 53	5 52	5 52	5 51	5 51	5 51	5 50	5 50	5 49	5 49	5 50	5 50	5 50	5 50	5 51	5 52	5 53	5 55	5 57	6 00	6 05	S.	
3	R.	5 49	5 48	5 47	5 46	5 45	5 44	5 43	5 42	5 41	5 40	5 39	5 39	5 38	5 37	5 37	5 37	5 37	5 37	5 37	5 37	5 38	5 39	5 41	5 44	5 49	R.	3
	S.	5 56	5 55	5 55	5 54	5 54	5 53	5 52	5 51	5 51	5 51	5 51	5 51	5 50	5 50	5 51	5 51	5 51	5 51	5 52	5 53	5 55	5 56	5 58	6 02	6 07	S.	
4	R.	5 49	5 48	5 47	5 46	5 45	5 44	5 43	5 42	5 41	5 40	5 39	5 38	5 37	5 36	5 36	5 36	5 36	5 35	5 35	5 36	5 36	5 38	5 39	5 43	5 48	R.	4
	S.	5 56	5 55	5 55	5 54	5 54	5 53	5 53	5 52	5 52	5 52	5 52	5 51	5 51	5 51	5 52	5 52	5 52	5 52	5 53	5 55	5 56	5 58	6 00	6 04	6 09	S.	
5	R.	5 49	5 48	5 46	5 45	5 44	5 43	5 42	5 41	5 40	5 39	5 38	5 37	5 36	5 35	5 35	5 35	5 34	5 34	5 34	5 34	5 35	5 36	5 38	5 41	5 46	R.	5
	S.	5 56	5 55	5 55	5 54	5 54	5 53	5 53	5 53	5 53	5 53	5 53	5 52	5 52	5 52	5 53	5 53	5 53	5 54	5 55	5 56	5 58	5 59	6 02	6 05	6 11	S.	
6	R.	5 48	5 47	5 46	5 45	5 44	5 43	5 42	5 40	3 39	5 38	5 37	5 37	5 36	5 35	5 34	5 34	5 33	5 33	5 33	5 33	5 33	5 35	5 36	5 40	5 44	R.	6
	S.	5 56	5 55	5 55	5 54	5 54	5 54	5 54	5 53	5 53	5 53	5 53	5 53	5 53	5 53	5 54	5 54	5 54	5 55	5 56	5 57	5 59	6 01	6 03	6 07	6 12	S.	
7	R.	5 48	5 47	5 46	5 45	5 44	5 42	5 41	5 40	5 39	5 38	5 37	5 36	5 35	5 34	5 33	5 32	5 32	5 31	5 31	5 32	5 32	5 33	5 34	5 38	5 42	R.	7
	S.	5 56	5 55	5 55	5 55	5 55	5 54	5 54	5 54	5 54	5 54	5 54	5 54	5 54	5 54	5 55	5 55	5 56	5 56	5 57	5 59	6 01	6 03	6 05	6 09	6 14	S.	
8	R.	5 48	5 47	5 46	5 45	5 43	5 42	5 41	5 39	5 38	5 37	5 36	5 35	5 34	5 33	5 32	5 31	5 31	5 30	5 30	5 30	5 30	5 31	5 33	5 36	5 41	R.	8
	S.	5 56	5 55	5 55	5 55	5 55	5 55	5 55	5 54	5 54	5 54	5 55	5 55	5 55	5 55	5 56	5 56	5 57	5 58	5 59	6 00	6 02	6 04	6 07	6 11	6 16	S.	
9	R.	5 48	5 47	5 46	5 44	5 43	5 41	5 40	5 39	5 37	5 36	5 35	5 34	5 33	5 32	5 31	5 30	5 29	5 29	5 28	5 29	5 29	5 30	5 31	5 34	5 39	R.	9
	S.	5 56	5 56	5 56	5 55	5 55	5 55	5 55	5 55	5 55	5 55	5 56	5 56	5 56	5 56	5 57	5 57	5 58	5 59	6 00	6 02	6 04	6 06	6 09	6 13	6 18	S.	
10	R.	5 48	5 47	5 46	5 44	5 43	5 41	5 40	5 38	5 37	5 36	5 34	5 33	5 32	5 31	5 30	5 29	5 28	5 28	5 27	5 27	5 27	5 28	5 29	5 32	5 37	R.	10
	S.	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 57	5 58	5 58	5 59	6 00	6 01	6 03	6 05	6 07	6 10	6 14	6 19	S.	
11	R.	5 48	5 47	5 46	5 44	5 42	5 41	5 39	5 37	5 36	5 35	5 33	5 32	5 31	5 30	5 29	5 28	5 27	5 26	5 26	5 26	5 26	5 27	5 28	5 30	5 35	R.	11
	S.	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 57	5 57	5 57	5 57	5 58	5 59	5 59	6 00	6 01	6 03	6 05	6 07	6 09	6 12	6 16	6 21	S.	
12	R.	5 48	5 47	5 46	5 44	5 42	5 40	5 39	5 37	5 36	5 34	5 33	5 32	5 30	5 29	5 28	5 27	5 26	5 25	5 25	5 25	5 25	5 25	5 26	5 29	5 33	R.	12
	S.	5 56	5 56	5 56	5 56	5 56	5 56	5 57	5 57	5 57	5 57	5 58	5 58	5 58	5 59	6 00	6 00	6 01	6 02	6 04	6 06	6 08	6 10	6 13	6 18	6 23	S.	
13	R.	5 48	5 47	5 45	5 43	5 42	5 40	5 38	5 36	5 35	5 33	5 32	5 31	5 29	5 28	5 27	5 26	5 25	5 24	5 23	5 23	5 23	5 24	5 24	5 27	5 31	R.	13
	S.	5 56	5 56	5 56	5 56	5 57	5 57	5 57	5 57	5 58	5 58	5 59	5 59	5 59	6 00	6 01	6 02	6 03	6 04	6 05	6 07	6 10	6 12	6 15	6 20	6 25	S.	
14	R.	5 48	5 47	5 45	5 43	5 42	5 40	5 38	5 36	5 34	5 33	5 31	5 30	5 28	5 27	5 26	5 25	5 24	5 23	5 22	5 22	5 21	5 22	5 23	5 25	5 29	R.	14
	S.	5 56	5 56	5 56	5 56	5 57	5 57	5 58	5 58	5 58	5 59	5 59	6 00	6 00	6 01	6 02	6 03	6 04	6 05	6 07	6 09	6 11	6 14	6 17	6 22	6 27	S.	
15	R.	5 48	5 46	5 45	5 43	5 41	5 39	5 37	5 35	5 34	5 32	5 30	5 29	5 27	5 26	5 25	5 24	5 22	5 21	5 20	5 20	5 20	5 20	5 21	5 23	5 27	R.	15
	S.	5 56	5 56	5 57	5 57	5 57	5 57	5 58	5 58	5 59	5 59	6 00	6 01	6 01	6 02	6 03	6 04	6 05	6 06	6 08	6 10	6 13	6 15	6 19	6 24	6 29	S.	
16	R.	5 48	5 46	5 45	5 43	5 41	5 39	5 37	5 35	5 33	5 32	5 30	5 28	5 26	5 25	5 24	5 23	5 21	5 20	5 19	5 19	5 19	5 19	5 19	5 21	5 25	R.	16
	S.	5 56	5 56	5 57	5 57	5 58	5 58	5 59	5 59	5 59	6 00	6 01	6 01	6 02	6 03	6 04	6 05	6 06	6 08	6 10	6 12	6 14	6 17	6 20	6 25	6 31	S.	
17	R.	5 48	5 46	5 45	5 42	5 40	5 38	5 36	5 34	5 32	5 31	5 29	5 27	5 25	5 24	5 22	5 21	5 20	5 18	5 17	5 17	5 17	5 17	5 17	5 19	5 23	R.	17
	S.	5 56	5 56	5 57	5 57	5 58	5 58	5 59	5 59	6 00	6 01	6 02	6 02	6 03	6 04	6 05	6 06	6 08	6 09	6 11	6 14	6 16	6 19	6 22	6 27	6 33	S.	
18	R.	5 48	5 46	5 45	5 42	5 40	5 38	5 36	5 34	5 32	5 30	5 28	5 26	5 24	5 23	5 21	5 20	5 19	5 17	5 16	5 15	5 15	5 15	5 16	5 18	5 21	R.	18
	S.	5 56	5 56	5 57	5 57	5 58	5 58	5 59	6 00	6 01	6 01	6 02	6 03	6 04	6 05	6 06	6 07	6 09	6 11	6 13	6 15	6 18	6 20	6 24	6 29	6 35	S.	
19	R.	5 48	5 46	5 44	5 42	5 40	5 38	5 36	5 33	5 31	5 29	5 27	5 25	5 23	5 22	5 20	5 19	5 17	5 16	5 14	5 14	5 13	5 18	5 14	5 16	5 19	R.	19
	S.	5 56	5 56	5 57	5 58	5 59	5 59	6 00	6 00	6 01	6 02	6 03	6 04	6 05	6 06	6 07	6 09	6 10	6 12	6 14	6 17	6 19	6 22	6 26	6 31	6 37	S.	
20	R.	5 48	5 46	5 44	5 42	5 40	5 37	5 35	5 33	5 31	5 29	5 27	5 25	5 22	5 21	5 19	5 18	5 16	5 15	5 13	5 12	5 12	5 12	5 12	5 14	5 17	R.	20
	S.	5 56	5 56	5 57	5 58	5 59	5 59	6 00	6 01	6 02	6 03	6 04	6 05	6 06	6 07	6 08	6 10	6 12	6 14	6 16	6 18	6 21	6 24	6 28	6 33	6 39	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

South latitude: 21° to 40°—September 23 to December 22.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. S.	Approx. date.	SEPTEMBER.			OCTOBER.												NOVEMBER.							DECEMBER.			Approx. date.	Lat. S.
		23	26	28	1	4	6	9	11	14	17	19	22	25	28	31	3	6	10	14	17	22	27	3	11	22		
	Dec. S.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	23° 27′	Dec. S.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
21	R.	5 48	5 46	5 44	5 41	5 39	5 37	5 35	5 32	5 30	5 28	5 26	5 24	5 21	5 19	5 18	5 16	5 14	5 13	5 12	5 11	5 10	5 10	5 10	5 11	5 15	R.	21
	S.	5 56	5 57	5 58	5 58	5 59	6 00	6 01	6 01	6 03	6 04	6 05	6 06	6 07	6 08	6 10	6 11	6 13	6 15	6 17	6 20	6 23	6 26	6 30	6 35	6 41	S.	
22	R.	5 48	5 46	5 44	5 41	5 39	5 36	5 34	5 32	5 29	5 27	5 25	5 23	5 20	5 18	5 17	5 15	5 13	5 11	5 10	5 09	5 08	5 08	5 08	5 09	5 13	R.	22
	S.	5 56	5 57	5 58	5 58	5 59	6 00	6 01	6 02	6 03	6 04	6 05	6 07	6 08	6 09	6 11	6 12	6 14	6 16	6 19	6 21	6 24	6 28	6 32	6 37	6 43	S.	
23	R.	5 48	5 46	5 44	5 41	5 39	5 36	5 34	5 31	5 29	5 27	5 24	5 22	5 19	5 17	5 15	5 14	5 12	5 10	5 08	5 07	5 06	5 06	5 06	5 07	5 11	R.	23
	S.	5 56	5 57	5 58	5 59	6 00	6 01	6 02	6 03	6 04	6 05	6 06	6 08	6 09	6 10	6 12	6 14	6 16	6 18	6 20	6 23	6 26	6 30	6 34	6 39	6 45	S.	
24	R.	5 48	5 46	5 44	5 41	5 38	5 35	5 33	5 30	5 28	5 26	5 23	5 21	5 18	5 16	5 14	5 12	5 10	5 08	5 07	5 06	5 05	5 04	5 04	5 05	5 09	R.	24
	S.	5 56	5 57	5 58	5 59	6 00	6 01	6 02	6 03	6 04	6 06	6 07	6 09	6 10	6 11	6 13	6 15	6 17	6 19	6 22	6 25	6 28	6 31	6 36	6 41	6 47	S.	
25	R.	5 48	5 46	5 43	5 40	5 38	5 35	5 33	5 30	5 27	5 25	5 22	5 20	5 17	5 15	5 13	5 11	5 09	5 07	5 05	5 04	5 03	5 02	5 02	5 03	5 07	R.	25
	S.	5 56	5 57	5 58	5 59	6 01	6 02	6 03	6 04	6 05	6 07	6 08	6 10	6 11	6 13	6 15	6 17	6 19	6 21	6 24	6 27	6 30	6 33	6 38	6 44	6 50	S.	
26	R.	5 48	5 45	5 43	5 40	5 38	5 35	5 32	5 29	5 27	5 24	5 21	5 19	5 16	5 14	5 12	5 10	5 07	5 05	5 03	5 02	5 01	5 00	5 00	5 01	5 05	R.	26
	S.	5 56	5 57	5 58	5 59	6 01	6 02	6 03	6 04	6 06	6 07	6 09	6 11	6 12	6 14	6 16	6 18	6 20	6 22	6 25	6 28	6 31	6 35	6 40	6 46	6 52	S.	
27	R.	5 48	5 45	5 43	5 40	5 37	5 34	5 32	5 29	5 26	5 23	5 20	5 18	5 15	5 13	5 10	5 08	5 06	5 04	5 02	5 01	4 59	4 58	4 58	4 59	5 02	R.	27
	S.	5 57	5 58	5 59	6 00	6 01	6 02	6 04	6 05	6 07	6 08	6 10	6 12	6 13	6 15	6 17	6 19	6 22	6 24	6 27	6 30	6 33	6 37	6 42	6 48	6 54	S.	
28	R.	5 48	5 45	5 42	5 39	5 37	5 34	5 31	5 28	5 25	5 22	5 19	5 17	5 14	5 11	5 09	5 07	5 04	5 02	5 00	4 59	4 57	4 56	4 56	4 57	5 00	R.	28
	S.	5 57	5 58	5 59	6 00	6 02	6 03	6 04	6 06	6 08	6 09	6 11	6 13	6 14	6 16	6 19	6 21	6 23	6 25	6 28	6 31	6 35	6 39	6 44	6 50	6 56	S.	
29	R.	5 48	5 45	5 42	5 39	5 36	5 33	5 30	5 27	5 24	5 21	5 18	5 16	5 13	5 10	5 07	5 05	5 03	5 00	4 58	4 57	4 55	4 54	4 53	4 54	4 58	R.	29
	S.	5 57	5 58	5 59	6 00	6 02	6 03	6 05	6 07	6 09	6 10	6 12	6 14	6 16	6 18	6 20	6 22	6 25	6 27	6 30	6 33	6 37	6 41	6 46	6 52	6 59	S.	
30	R.	5 48	5 45	5 42	5 39	5 36	5 33	5 30	5 26	5 23	5 20	5 17	5 15	5 12	5 09	5 06	5 04	5 01	4 59	4 57	4 55	4 53	4 52	4 51	4 52	4 55	R.	30
	S.	5 57	5 58	5 59	6 01	6 02	6 04	6 06	6 07	6 09	6 11	6 13	6 15	6 17	6 19	6 21	6 24	6 26	6 29	6 32	6 35	6 39	6 43	6 48	6 55	7 01	S.	
31	R.	5 48	5 45	5 42	5 39	5 36	5 32	5 29	5 26	5 22	5 19	5 16	5 13	5 10	5 07	5 05	5 02	5 00	4 57	4 55	4 53	4 51	4 50	4 49	4 49	4 53	R.	31
	S.	5 57	5 58	6 00	6 01	6 03	6 04	6 06	6 08	6 10	6 12	6 14	6 16	6 18	6 20	6 23	6 25	6 28	6 31	6 34	6 37	6 41	6 46	6 51	6 57	7 04	S.	
32	R.	5 48	5 44	5 41	5 38	5 35	5 32	5 29	5 25	5 22	5 18	5 15	5 12	5 09	5 06	5 03	5 01	4 58	4 55	4 53	4 51	4 49	4 48	4 46	4 47	4 50	R.	32
	S.	5 57	5 58	6 00	6 01	6 03	6 05	6 07	6 09	6 11	6 13	6 15	6 17	6 19	6 21	6 24	6 27	6 30	6 33	6 36	6 39	6 43	6 48	6 53	7 00	7 06	S.	
33	R.	5 48	5 44	5 41	5 38	5 35	5 31	5 28	5 24	5 21	5 17	5 14	5 11	5 08	5 05	5 02	4 59	4 56	4 53	4 51	4 49	4 47	4 45	4 44	4 44	4 48	R.	33
	S.	5 57	5 58	6 00	6 02	6 04	6 06	6 08	6 10	6 12	6 14	6 16	6 18	6 21	6 23	6 26	6 28	6 31	6 34	6 38	6 42	6 46	6 50	6 56	7 02	7 09	S.	
34	R.	5 48	5 44	5 41	5 37	5 34	5 30	5 27	5 23	5 20	5 16	5 13	5 10	5 07	5 03	5 00	4 57	4 54	4 51	4 49	4 47	4 45	4 43	4 41	4 42	4 45	R.	34
	S.	5 57	5 58	6 00	6 02	6 04	6 06	6 08	6 10	6 12	6 15	6 17	6 19	6 22	6 24	6 27	6 30	6 33	6 36	6 40	6 44	6 48	6 53	6 58	7 04	7 11	S.	
35	R.	5 48	5 44	5 41	5 37	5 34	5 30	5 26	5 23	5 19	5 15	5 12	5 09	5 05	5 02	4 59	4 56	4 53	4 50	4 47	4 45	4 42	4 40	4 39	4 39	4 42	R.	35
	S.	5 57	5 58	6 01	6 03	6 05	6 07	6 09	6 11	6 13	6 16	6 18	6 21	6 23	6 26	6 29	6 32	6 35	6 38	6 42	6 46	6 50	6 55	7 01	7 07	7 14	S.	
36	R.	5 48	5 44	5 41	5 37	5 33	5 29	5 26	5 22	5 18	5 14	5 11	5 08	5 04	5 00	4 57	4 54	4 51	4 48	4 45	4 42	4 40	4 38	4 36	4 36	4 39	R.	36
	S.	5 57	5 59	6 01	6 03	6 05	6 07	6 10	6 12	6 14	6 17	6 19	6 22	6 25	6 27	6 30	6 33	6 37	6 40	6 44	6 48	6 53	6 58	7 03	7 10	7 17	S.	
37	R.	5 48	5 44	5 40	5 36	5 33	5 28	5 25	5 21	5 17	5 13	5 10	5 06	5 02	4 59	4 55	4 52	4 49	4 46	4 43	4 40	4 37	4 35	4 34	4 33	4 36	R.	37
	S.	5 57	5 59	6 01	6 03	6 06	6 08	6 11	6 13	6 15	6 18	6 21	6 23	6 26	6 29	6 32	6 35	6 39	6 42	6 46	6 51	6 55	7 00	7 06	7 13	7 20	S.	
38	R.	5 47	5 44	5 40	5 36	5 32	5 28	5 24	5 20	5 16	5 12	5 09	5 05	5 01	4 57	4 54	4 50	4 47	4 44	4 41	4 38	4 35	4 33	4 31	4 30	4 33	R.	38
	S.	5 57	5 59	6 02	6 04	6 06	6 09	6 11	6 13	6 16	6 19	6 22	6 25	6 28	6 31	6 34	6 37	6 41	6 44	6 48	6 53	6 58	7 03	7 09	7 16	7 23	S.	
39	R.	5 47	5 43	5 39	5 35	5 31	5 27	5 23	5 19	5 15	5 11	5 07	5 03	4 59	4 55	4 52	4 48	4 45	4 41	4 38	4 35	4 32	4 30	4 28	4 27	4 30	R.	39
	S.	5 57	5 59	6 02	6 04	6 07	6 09	6 12	6 14	6 17	6 20	6 23	6 26	6 29	6 32	6 36	6 39	6 43	6 47	6 51	6 55	7 00	7 06	7 12	7 19	7 26	S.	
40	R.	5 47	5 43	5 39	5 35	5 31	5 27	5 23	5 18	5 14	5 10	5 06	5 02	4 58	4 54	4 50	4 47	4 43	4 39	4 36	4 33	4 30	4 27	4 25	4 24	4 27	R.	40
	S.	5 57	5 59	6 02	6 05	6 07	6 10	6 13	6 15	6 18	6 21	6 24	6 27	6 31	6 34	6 37	6 41	6 45	6 49	6 53	6 58	7 03	7 09	7 15	7 22	7 29	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

South Latitude: 41° to 60°—September 23 to December 22.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. S.	Approx. date.	SEPTEMBER.			OCTOBER.												NOVEMBER.							DECEMBER.			Approx. date.	Lat. S.
		23	26	28	1	4	6	9	11	14	17	19	22	25	28	31	3	6	10	14	17	22	27	8	11	22		
	Dec. S.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	23° 27′	Dec. S.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
41	R.	5 47	5 43	5 39	5 35	5 31	5 26	5 22	5 17	5 13	5 09	5 05	5 01	4 56	4 52	4 48	4 45	4 41	4 37	4 33	4 30	4 27	4 24	4 22	4 21	4 24	R.	41
	S.	5 57	6 00	6 03	6 05	6 08	6 11	6 14	6 16	6 19	6 22	6 26	6 29	6 32	6 35	6 39	6 43	6 47	6 51	6 55	7 00	7 06	7 11	7 18	7 25	7 33	S.	
42	R.	5 47	5 43	5 39	5 34	5 30	5 25	5 21	5 17	5 12	5 08	5 04	4 59	4 55	4 50	4 46	4 43	4 39	4 35	4 31	4 28	4 24	4 21	4 19	4 18	4 20	R.	42
	S.	5 57	6 00	6 03	6 05	6 08	6 11	6 14	6 17	6 20	6 23	6 27	6 30	6 34	6 37	6 41	6 45	6 49	6 53	6 58	7 03	7 08	7 14	7 21	7 28	7 36	S.	
43	R.	5 47	5 42	5 38	5 34	5 29	5 25	5 20	5 16	5 11	5 07	5 02	4 58	4 53	4 49	4 44	4 40	4 36	4 32	4 28	4 25	4 21	4 18	4 15	4 14	4 17	R.	43
	S.	5 57	6 00	6 03	6 06	6 09	6 12	6 15	6 18	6 21	6 25	6 28	6 32	6 35	6 39	6 43	6 47	6 51	6 55	7 00	7 06	7 11	7 17	7 24	7 32	7 40	S.	
44	R.	5 47	5 42	5 38	5 33	5 29	5 24	5 19	5 15	5 10	5 06	5 01	4 56	4 52	4 47	4 42	4 38	4 34	4 29	4 25	4 22	4 18	4 15	4 12	4 10	4 13	R.	44
	S.	5 58	6 01	6 04	6 07	6 10	6 13	6 16	6 19	6 22	6 26	6 30	6 33	6 37	6 41	6 45	6 49	6 54	6 58	7 03	7 09	7 15	7 21	7 28	7 36	7 44	S.	
45	R.	5 47	5 42	5 37	5 33	5 28	5 23	5 18	5 13	5 09	5 04	4 59	4 55	4 50	4 45	4 40	4 36	4 31	4 27	4 22	4 18	4 15	4 11	4 08	4 06	4 09	R.	45
	S.	5 58	6 01	6 04	6 07	6 11	6 14	6 17	6 20	6 24	6 27	6 31	6 35	6 39	6 43	6 47	6 52	6 56	7 01	7 06	7 12	7 18	7 25	7 32	7 40	7 48	S.	
46	R.	5 47	5 42	5 37	5 32	5 27	5 22	5 17	5 12	5 08	5 03	4 58	4 53	4 48	4 43	4 38	4 34	4 29	4 24	4 19	4 15	4 11	4 07	4 04	4 02	4 05	R.	46
	S.	5 58	6 01	6 04	6 07	6 11	6 14	6 18	6 21	6 25	6 29	6 33	6 36	6 40	6 45	6 49	6 54	6 59	7 04	7 09	7 15	7 21	7 28	7 36	7 44	7 52	S.	
47	R.	5 47	5 42	5 37	5 32	5 27	5 21	5 16	5 11	5 06	5 01	4 56	4 51	4 46	4 41	4 36	4 31	4 26	4 21	4 16	4 12	4 08	4 04	4 00	3 58	4 00	R.	47
	S.	5 58	6 01	6 05	6 08	6 12	6 15	6 19	6 22	6 26	6 30	6 34	6 38	6 42	6 47	6 52	6 56	7 01	7 06	7 12	7 18	7 25	7 32	7 40	7 48	7 56	S.	
48	R.	5 47	5 41	5 36	5 31	5 26	5 21	5 15	5 10	5 05	5 00	4 54	4 49	4 44	4 39	4 33	4 28	4 23	4 18	4 13	4 09	4 04	4 00	3 56	3 54	3 56	R.	48
	S.	5 58	6 01	6 05	6 08	6 12	6 16	6 20	6 24	6 28	6 32	6 36	6 40	6 44	6 49	6 54	6 59	7 04	7 09	7 15	7 22	7 28	7 35	7 44	7 53	8 01	S.	
49	R.	5 47	5 41	5 36	5 30	5 25	5 20	5 14	5 09	5 03	4 58	4 52	4 47	4 42	4 36	4 31	4 26	4 20	4 15	4 10	4 05	4 01	3 56	3 52	3 49	3 51	R.	49
	S.	5 58	6 02	6 06	6 09	6 13	6 17	6 21	6 25	6 29	6 34	6 38	6 42	6 47	6 52	6 57	7 02	7 07	7 13	7 19	7 25	7 32	7 39	7 48	7 57	8 05	S.	
50	R.	5 46	5 41	5 36	5 30	5 25	5 19	5 13	5 07	5 02	4 56	4 51	4 45	4 40	4 34	4 28	4 23	4 17	4 12	4 07	4 02	3 57	3 52	3 47	3 44	3 46	R.	50
	S.	5 58	6 02	6 06	6 10	6 14	6 18	6 22	6 26	6 31	6 35	6 40	6 44	6 49	6 54	6 59	7 05	7 10	7 16	7 22	7 29	7 36	7 44	7 52	8 02	8 10	S.	
51	R.	5 46	5 41	5 35	5 29	5 24	5 18	5 12	5 06	5 00	4 55	4 49	4 43	4 37	4 31	4 26	4 20	4 14	4 08	4 03	3 58	3 52	3 47	3 43	3 39	3 41	R.	51
	S.	5 58	6 02	6 06	6 10	6 15	6 19	6 24	6 28	6 32	6 37	6 42	6 46	6 51	6 56	7 02	7 08	7 13	7 19	7 26	7 33	7 40	7 48	7 57	8 07	8 16	S.	
52	R.	5 46	5 40	5 35	5 29	5 23	5 17	5 11	5 04	4 59	4 53	4 47	4 41	4 35	4 29	4 23	4 17	4 11	4 05	3 59	3 53	3 48	3 42	3 37	3 34	3 35	R.	52
	S.	5 58	6 02	6 07	6 11	6 16	6 20	6 25	6 29	6 34	6 39	6 44	6 49	6 54	6 59	7 05	7 11	7 17	7 23	7 30	7 37	7 45	7 53	8 02	8 13	8 21	S.	
53	R.	5 46	5 40	5 34	5 28	5 22	5 15	5 09	5 03	4 57	4 51	4 45	4 39	4 32	4 26	4 20	4 14	4 07	4 01	3 55	3 49	3 43	3 37	3 32	3 28	3 29	R.	53
	S.	5 58	6 03	6 07	6 12	6 17	6 21	6 26	6 31	6 36	6 41	6 46	6 51	6 56	7 02	7 08	7 14	7 20	7 27	7 34	7 42	7 50	7 58	8 08	8 19	8 27	S.	
54	R.	5 46	5 40	5 34	5 27	5 21	5 14	5 08	5 01	4 55	4 49	4 43	4 36	4 30	4 23	4 17	4 10	4 04	3 57	3 50	3 44	3 38	3 32	3 26	3 22	3 23	R.	54
	S.	5 59	6 03	6 08	6 12	6 18	6 22	6 27	6 32	6 37	6 43	6 48	6 53	6 59	7 06	7 11	7 17	7 24	7 31	7 38	7 46	7 55	8 04	8 14	8 25	8 34	S.	
55	R.	5 46	5 39	5 33	5 26	5 20	5 13	5 07	5 00	4 53	4 47	4 40	4 34	4 27	4 20	4 13	4 07	4 00	3 53	3 46	3 39	3 33	3 26	3 20	3 15	3 16	R.	55
	S.	5 59	6 03	6 08	6 13	6 18	6 23	6 29	6 34	6 39	6 45	6 50	6 56	7 02	7 08	7 14	7 21	7 28	7 35	7 43	7 51	8 00	8 09	8 20	8 32	8 41	S.	
56	R.	5 45	5 39	5 33	5 26	5 19	5 12	5 05	4 58	4 51	4 45	4 38	4 31	4 24	4 17	4 10	4 03	3 55	3 48	3 41	3 34	3 27	3 20	3 13	3 08	3 08	R.	56
	S.	5 59	6 04	6 09	6 14	6 20	6 25	6 30	6 35	6 41	6 47	6 53	6 59	7 05	7 11	7 18	7 25	7 32	7 40	7 48	7 56	8 05	8 15	8 26	8 39	8 48	S.	
57	R.	5 45	5 38	5 32	5 25	5 18	5 11	5 04	4 56	4 49	4 42	4 35	4 28	4 20	4 13	4 06	3 58	3 51	3 43	3 36	3 28	3 21	3 13	3 06	3 00	3 00	R.	57
	S.	5 59	6 04	6 10	6 15	6 21	6 26	6 32	6 37	6 43	6 49	6 56	7 02	7 08	7 15	7 22	7 29	7 37	7 45	7 53	8 02	8 12	8 22	8 33	8 46	8 56	S.	
58	R.	5 45	5 38	5 31	5 24	5 17	5 09	5 02	4 54	4 47	4 40	4 32	4 25	4 17	4 09	4 02	3 54	3 46	3 38	3 30	3 22	3 14	3 06	2 58	2 51	2 51	R.	58
	S.	5 59	6 05	6 10	6 16	6 22	6 27	6 33	6 39	6 45	6 52	6 58	7 05	7 12	7 19	7 26	7 34	7 42	7 50	7 59	8 08	8 18	8 29	8 41	8 55	9 05	S.	
59	R.	5 45	5 37	5 30	5 23	5 15	5 08	5 00	4 52	4 45	4 37	4 29	4 21	4 13	4 05	3 57	3 49	3 41	3 32	3 24	3 16	3 07	2 58	2 50	2 42	2 42	R.	59
	S.	6 00	6 05	6 11	6 17	6 23	6 29	6 35	6 41	6 48	6 54	7 01	7 08	7 15	7 23	7 31	7 39	7 47	7 55	8 04	8 14	8 25	8 37	8 50	9 04	9 15	S.	
60	R.	5 45	5 37	5 30	5 22	5 14	5 06	4 58	4 50	4 43	4 35	4 27	4 18	4 10	4 01	3 53	3 44	3 35	3 27	3 18	3 09	3 00	2 51	2 41	2 31	2 31	R.	60
	S.	6 00	6 06	6 12	6 18	6 24	6 30	6 37	6 43	6 50	6 57	7 04	7 11	7 19	7 27	7 35	7 43	7 52	8 01	8 11	8 22	8 33	8 45	8 59	9 15	9 26	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

South Latitude: 0° to 20°—December 22 to March 21.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. S.	Approx. date.	DECEMBER.	JANUARY.						FEBRUARY.									MARCH.									Approx. date.	Lat. S.
		22	2	10	16	21	25	29	2	5	9	12	15	18	20	23	26	1	3	6	8	11	13	16	18	21		
	Dec. S.	23° 27′	23°	22°	21°	20°	19°	18°	17°	16°	15°	14°	13°	12°	11°	10°	9°	8°	7°	6°	5°	4°	3°	2°	1°	0°	Dec. S.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
0	R.	5 54	6 00	6 04	6 06	6 07	6 08	6 09	6 10	6 10	6 10	6 10	6 10	6 10	6 10	6 10	6 09	6 09	6 08	6 08	6 07	6 06	6 06	6 05	6 04	6 04	R.	0
	S.	6 02	6 08	6 12	6 14	6 15	6 16	6 17	6 18	6 18	6 18	6 18	6 18	6 18	6 18	6 18	6 17	6 17	6 16	6 16	6 15	6 14	6 14	6 13	6 12	6 11	S.	
1	R.	5 53	5 58	6 02	6 04	6 06	6 07	6 08	6 09	6 09	6 09	6 09	6 10	6 10	6 09	6 09	6 09	6 08	6 08	6 08	6 07	6 06	6 06	6 05	6 04	6 04	R.	1
	S.	6 04	6 09	6 13	6 15	6 17	6 17	6 18	6 19	6 19	6 19	6 19	6 19	6 19	6 18	6 18	6 18	6 17	6 16	6 16	6 15	6 14	6 14	6 13	6 12	6 11	S.	
2	R.	5 51	5 57	6 01	6 03	6 04	6 06	6 07	6 08	6 08	6 08	6 08	6 09	6 09	6 09	6 09	6 08	6 08	6 08	6 08	6 07	6 06	6 06	6 05	6 04	6 04	R.	2
	S.	6 05	6 11	6 15	6 17	6 18	6 19	6 19	6 20	6 20	6 20	6 20	6 20	6 19	6 19	6 19	6 18	6 17	6 17	6 16	6 15	6 14	6 14	6 13	6 12	6 11	S.	
3	R.	5 49	5 55	5 59	6 01	6 03	6 04	6 06	6 07	6 07	6 07	6 07	6 08	6 08	6 08	6 08	6 08	6 08	6 07	6 07	6 07	6 06	6 06	6 05	6 04	6 04	R.	3
	S.	6 07	6 13	6 16	6 18	6 20	6 20	6 21	6 21	6 21	6 21	6 21	6 21	6 20	6 20	6 20	6 19	6 18	6 17	6 16	6 16	6 15	6 14	6 13	6 12	6 11	S.	
4	R.	5 48	5 53	5 57	6 00	6 01	6 03	6 04	6 05	6 06	6 06	6 06	6 07	6 07	6 07	6 07	6 07	6 07	6 07	6 07	6 07	6 06	6 06	6 05	6 04	6 04	R.	4
	S.	6 09	6 14	6 18	6 20	6 21	6 22	6 22	6 22	6 22	6 22	6 22	6 22	6 21	6 20	6 20	6 19	6 18	6 18	6 17	6 16	6 15	6 14	6 13	6 12	6 11	S.	
5	R.	5 46	5 52	5 56	5 58	6 00	6 01	6 03	6 04	6 05	6 05	6 05	6 06	6 06	6 06	6 06	6 06	6 06	6 06	6 06	6 06	6 05	6 05	6 04	6 04	6 04	R.	5
	S.	6 11	6 16	6 20	6 21	6 23	6 23	6 24	6 24	6 24	6 23	6 23	6 23	6 22	6 21	6 21	6 20	6 19	6 18	6 17	6 16	6 15	6 14	6 13	6 12	6 11	S.	
6	R.	5 44	5 50	5 54	5 57	5 58	6 00	6 02	6 03	6 04	6 04	6 04	6 05	6 06	6 06	6 06	6 06	6 06	6 06	6 06	6 06	6 05	6 05	6 04	6 04	6 03	R.	6
	S.	6 12	6 17	6 21	6 23	6 24	6 24	6 25	6 25	6 25	6 24	6 24	6 23	6 23	6 22	6 22	6 21	6 20	6 19	6 18	6 17	6 15	6 14	6 13	6 12	6 11	S.	
7	R.	5 42	5 48	5 52	5 55	5 57	5 59	6 00	6 01	6 02	6 03	6 03	6 04	6 05	6 05	6 05	6 05	6 06	6 05	6 05	6 05	6 05	6 06	6 04	6 04	6 03	R.	7
	S.	6 14	6 19	6 23	6 25	6 26	6 26	6 26	6 26	6 26	6 26	6 25	6 24	6 24	6 23	6 22	6 21	6 20	6 19	6 18	6 17	6 16	6 15	6 13	6 12	6 11	S.	
8	R.	5 41	5 46	5 50	5 53	5 55	5 57	5 59	6 00	6 01	6 02	6 02	6 03	6 04	6 04	6 04	6 04	6 05	6 05	6 05	6 05	6 04	6 05	6 04	6 04	6 03	R.	8
	S.	6 16	6 21	6 25	6 26	6 27	6 27	6 28	6 27	6 27	6 27	6 26	6 25	6 25	6 24	6 23	6 22	6 21	6 20	6 19	6 18	6 16	6 15	6 13	6 12	6 11	S.	
9	R.	5 39	5 45	5 49	5 52	5 54	5 56	5 57	5 59	6 00	6 01	6 01	6 02	6 03	6 03	6 03	6 04	6 04	6 04	6 04	6 04	6 04	6 04	6 04	6 04	6 03	R.	9
	S.	6 18	6 23	6 27	6 28	6 29	6 29	6 29	6 29	6 29	6 28	6 27	6 26	6 26	6 25	6 24	6 23	6 22	6 20	6 19	6 18	6 17	6 15	6 14	6 13	6 11	S.	
10	R.	5 37	5 43	5 47	5 50	5 52	5 54	5 56	5 58	5 59	6 00	6 00	6 01	6 02	6 02	6 02	6 03	6 03	6 04	6 04	6 04	6 04	6 04	6 04	6 04	6 03	R.	10
	S.	6 19	6 25	6 28	6 29	6 30	6 30	6 30	6 30	6 30	6 29	6 28	6 27	6 26	6 25	6 24	6 23	6 22	6 21	6 20	6 18	6 17	6 15	6 14	6 13	6 11	S.	
11	R.	5 35	5 41	5 46	5 49	5 51	5 53	5 55	5 56	5 58	5 59	5 59	6 00	6 01	6 01	6 02	6 02	6 03	6 03	6 03	6 04	6 04	6 04	6 04	6 04	6 03	R.	11
	S.	6 21	6 27	6 30	6 31	6 32	6 32	6 32	6 31	6 31	6 30	6 29	6 28	6 27	6 26	6 25	6 24	6 23	6 21	6 20	6 19	6 17	6 16	6 14	6 13	6 11	S.	
12	R.	5 33	5 39	5 44	5 47	5 49	5 52	5 54	5 55	5 57	5 58	5 58	5 59	6 00	6 01	6 01	6 02	6 02	6 03	6 03	6 03	6 03	6 04	6 04	6 04	6 03	R.	12
	S.	6 23	6 28	6 31	6 32	6 33	6 33	6 33	6 32	6 32	6 31	6 30	6 29	6 28	6 27	6 26	6 25	6 23	6 22	6 21	6 19	6 17	6 16	6 14	6 13	6 11	S.	
13	R.	5 31	5 37	5 42	5 46	5 48	5 50	5 52	5 54	5 55	5 56	5 57	5 58	5 59	6 00	6 00	6 01	6 01	6 02	6 02	6 03	6 03	6 03	6 03	6 03	6 03	R.	13
	S.	6 25	6 30	6 33	6 34	6 35	6 34	6 34	6 34	6 33	6 32	6 31	6 30	6 29	6 28	6 27	6 26	6 24	6 23	6 21	6 20	6 18	6 16	6 14	6 13	6 11	S.	
14	R.	5 29	5 35	5 41	5 44	5 46	5 49	5 51	5 53	5 54	5 55	5 56	5 57	5 58	5 59	6 00	6 00	6 01	6 01	6 02	6 03	6 03	6 03	6 03	6 03	6 03	R.	14
	S.	6 27	6 32	6 35	6 36	6 36	6 36	6 36	6 35	6 34	6 33	6 32	6 31	6 30	6 29	6 28	6 26	6 25	6 23	6 22	6 20	6 18	6 16	6 14	6 13	6 11	S.	
15	R.	5 27	5 33	5 39	5 42	5 45	5 47	5 49	5 51	5 53	5 54	5 55	5 56	5 57	5 58	5 59	6 00	6 00	6 01	6 01	6 02	6 02	6 03	6 03	6 03	6 03	R.	15
	S.	6 29	6 34	6 37	6 37	6 38	6 37	6 37	6 36	6 35	6 34	6 33	6 32	6 31	6 30	6 28	6 27	6 25	6 24	6 22	6 20	6 18	6 17	6 15	6 13	6 11	S.	
16	R.	5 25	5 32	5 37	5 41	5 43	5 46	5 48	5 50	5 52	5 53	5 54	5 55	5 56	5 57	5 58	5 59	6 00	6 00	6 01	6 02	6 02	6 03	6 03	6 03	6 03	R.	16
	S.	6 31	6 36	6 38	6 39	6 39	6 39	6 39	6 38	6 37	6 35	6 34	6 33	6 32	6 30	6 29	6 27	6 26	6 24	6 23	6 21	6 19	6 17	6 15	6 13	6 11	S.	
17	R.	5 23	5 30	5 35	5 39	5 41	5 44	5 46	5 48	5 50	5 52	5 53	5 54	5 55	5 56	5 57	5 58	5 59	6 00	6 00	6 01	6 01	6 02	6 03	6 03	6 03	R.	17
	S.	6 33	6 38	6 40	6 41	6 41	6 41	6 40	6 39	6 38	6 37	6 36	6 34	6 33	6 31	6 30	6 28	6 27	6 25	6 23	6 21	6 19	6 17	6 15	6 13	6 11	S.	
18	R.	5 21	5 28	5 34	5 37	5 40	5 42	5 45	5 47	5 49	5 51	5 52	5 53	5 54	5 55	5 56	5 57	5 58	5 59	6 00	6 01	6 01	6 02	6 03	6 03	6 03	R.	18
	S.	6 35	6 39	6 42	6 42	6 43	6 42	6 41	6 40	6 39	6 38	6 37	6 35	6 34	6 32	6 31	6 29	6 27	6 25	6 23	6 21	6 19	6 17	6 15	6 13	6 11	S.	
19	R.	5 19	5 26	5 32	5 35	5 38	5 41	5 44	5 46	5 48	5 49	5 51	5 52	5 53	5 54	5 55	5 57	5 58	5 59	6 00	6 01	6 01	6 02	6 02	6 03	6 03	R.	19
	S.	6 37	6 41	6 44	6 44	6 44	6 44	6 43	6 42	6 41	6 39	6 38	6 36	6 35	6 33	6 31	6 30	6 28	6 26	6 24	6 22	6 20	6 18	6 15	6 13	6 11	S.	
20	R.	5 17	5 24	5 30	5 34	5 37	5 39	5 42	5 44	5 46	5 48	5 50	5 51	5 52	5 54	5 55	5 56	5 57	5 58	5 59	6 00	6 01	6 02	6 02	6 03	6 03	R.	20
	S.	6 39	6 43	6 46	6 46	6 46	6 45	6 44	6 43	6 42	6 40	6 39	6 37	6 36	6 34	6 32	6 30	6 28	6 26	6 24	6 22	6 20	6 18	6 15	6 13	6 11	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

South Latitude: 21° to 40°—December 22 to March 21.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. S.	Approx. date.	DECEMBER.	JANUARY.						FEBRUARY.									MARCH.									Approx. date.	Lat. S.
		22	2	10	16	21	25	29	2	5	9	12	15	18	20	23	26	1	3	6	8	11	13	16	18	21		
	Dec. S.	23° 27′	23°	22°	21°	20°	19°	18°	17°	16°	15°	14°	13°	12°	11°	10°	9°	8°	7°	6°	5°	4°	3°	2°	1°	0°	Dec. S.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
21	R.	5 15	5 22	5 28	5 32	5 35	5 38	5 41	5 43	5 45	5 47	5 48	5 50	5 51	5 53	5 54	5 55	5 56	5 58	5 59	6 00	6 00	6 01	6 02	6 03	6 03	R.	21
	S.	6 41	6 46	6 48	6 48	6 48	6 47	6 46	6 45	6 44	6 42	6 40	6 39	6 37	6 35	6 33	6 31	6 29	6 27	6 25	6 23	6 20	6 18	6 16	6 14	6 11	S.	
22	R.	5 13	5 20	5 26	5 30	5 33	5 36	5 39	5 41	5 44	5 46	5 47	5 49	5 50	5 52	5 53	5 54	5 56	5 57	5 58	6 00	6 00	6 01	6 02	6 03	6 03	R.	22
	S.	6 43	6 48	6 50	6 50	6 49	6 48	6 47	6 46	6 45	6 43	6 41	6 40	6 38	6 36	6 34	6 32	6 30	6 27	6 25	6 23	6 20	6 18	6 16	6 14	6 11	S.	
23	R.	5 11	5 18	5 24	5 28	5 31	5 34	5 37	5 40	5 42	5 44	5 46	5 48	5 49	5 51	5 53	5 54	5 55	5 57	5 58	5 59	6 00	6 01	6 02	6 03	6 03	R.	23
	S.	6 45	6 50	6 52	6 52	6 51	6 50	6 49	6 48	6 46	6 44	6 43	6 41	6 39	6 37	6 35	6 33	6 30	6 28	6 26	6 23	6 21	6 19	6 16	6 14	6 11	S.	
24	R.	5 09	5 16	5 22	5 26	5 30	5 33	5 36	5 38	5 41	5 43	5 45	5 47	5 48	5 50	5 52	5 53	5 55	5 56	5 57	5 59	6 00	6 01	6 02	6 03	6 03	R.	24
	S.	6 47	6 52	6 54	6 53	6 53	6 52	6 51	6 49	6 48	6 46	6 44	6 42	6 40	6 38	6 36	6 33	6 31	6 28	6 26	6 24	6 21	6 19	6 16	6 14	6 11	S.	
25	R.	5 07	5 14	5 20	5 24	5 28	5 31	5 34	5 37	5 39	5 41	5 43	5 45	5 47	5 49	5 51	5 52	5 54	5 55	5 57	5 58	5 59	6 00	6 01	6 02	6 03	R.	25
	S.	6 50	6 54	6 56	6 55	6 55	6 54	6 53	6 51	6 49	6 47	6 45	6 43	6 41	6 39	6 37	6 34	6 32	6 29	6 27	6 24	6 21	6 19	6 16	6 14	6 11	S.	
26	R.	5 05	5 12	5 18	5 22	5 26	5 29	5 32	5 35	5 38	5 40	5 42	5 44	5 46	5 48	5 50	5 51	5 53	5 55	5 56	5 58	5 59	6 00	6 01	6 02	6 03	R.	26
	S.	6 52	6 56	6 58	6 57	6 56	6 55	6 54	6 52	6 51	6 48	6 46	6 44	6 42	6 40	6 38	6 35	6 32	6 30	6 27	6 25	6 22	6 19	6 16	6 14	6 11	S.	
27	R.	5 02	5 09	5 16	5 20	5 24	5 28	5 31	5 34	5 36	5 39	5 41	5 43	5 45	5 47	5 49	5 50	5 52	5 54	5 56	5 57	5 58	6 00	6 01	6 02	6 03	R.	27
	S.	6 54	6 58	7 00	6 59	6 58	6 57	6 56	6 54	6 52	6 50	6 48	6 45	6 43	6 41	6 39	6 36	6 33	6 30	6 28	6 25	6 22	6 20	6 17	6 14	6 11	S.	
28	R.	5 00	5 07	5 14	5 18	5 22	5 26	5 29	5 32	5 35	5 37	5 39	5 42	5 44	5 46	5 48	5 49	5 51	5 53	5 55	5 57	5 58	5 59	6 00	6 02	6 03	R.	28
	S.	6 56	7 00	7 02	7 01	7 00	6 59	6 57	6 55	6 53	6 51	6 49	6 47	6 44	6 42	6 40	6 37	6 34	6 31	6 28	6 26	6 23	6 20	6 17	6 14	6 11	S.	
29	R.	4 58	5 05	5 11	5 16	5 20	5 24	5 27	5 30	5 33	5 36	5 38	5 40	5 43	5 45	5 47	5 48	5 50	5 52	5 54	5 56	5 58	5 59	6 00	6 02	6 03	R.	29
	S.	6 59	7 03	7 04	7 03	7 02	7 01	6 59	6 57	6 55	6 53	6 51	6 48	6 46	6 43	6 41	6 38	6 35	6 32	6 29	6 26	6 23	6 20	6 17	6 14	6 11	S.	
30	R.	4 55	5 02	5 09	5 14	5 18	5 22	5 26	5 29	5 32	5 34	5 37	5 39	5 42	5 44	5 46	5 48	5 50	5 52	5 54	5 56	5 57	5 59	6 00	6 02	6 03	R.	30
	S.	7 01	7 05	7 06	7 05	7 04	7 02	7 01	6 59	6 57	6 54	6 52	6 49	6 47	6 44	6 42	6 39	6 36	6 33	6 30	6 27	6 23	6 21	6 18	6 15	6 12	S.	
31	R.	4 53	5 00	5 07	5 12	5 16	5 20	5 24	5 27	5 30	5 33	5 35	5 38	5 40	5 42	5 45	5 47	5 49	5 51	5 53	5 55	5 57	5 58	6 00	6 02	6 03	R.	31
	S.	7 04	7 08	7 09	7 08	7 06	7 04	7 03	7 01	6 58	6 56	6 53	6 51	6 48	6 45	6 43	6 40	6 37	6 33	6 30	6 27	6 24	6 21	6 18	6 15	6 12	S.	
32	R.	4 50	4 57	5 04	5 10	5 14	5 18	5 22	5 25	5 28	5 31	5 34	5 37	5 39	5 41	5 44	5 46	5 48	5 51	5 53	5 55	5 56	5 58	5 59	6 01	6 03	R.	32
	S.	7 06	7 10	7 11	7 10	7 08	7 06	7 05	7 03	7 00	6 57	6 55	6 52	6 49	6 46	6 44	6 41	6 37	6 34	6 31	6 28	6 24	6 21	6 18	6 15	6 12	S.	
33	R.	4 48	4 55	5 02	5 07	5 12	5 16	5 20	5 23	5 27	5 30	5 32	5 35	5 38	5 40	5 54	5 45	5 47	5 50	5 52	5 54	5 56	5 58	5 59	6 01	6 03	R.	33
	S.	7 09	7 13	7 14	7 12	7 11	7 09	7 07	7 04	7 02	6 59	6 56	6 58	6 50	6 47	6 45	6 42	6 38	6 35	6 32	6 29	6 25	6 22	6 18	6 15	6 12	S.	
34	R.	4 45	4 52	4 59	5 05	5 10	5 14	5 18	5 21	5 25	5 28	5 31	5 34	5 37	5 39	5 42	5 44	5 47	5 49	5 51	5 53	5 55	5 57	5 59	6 01	6 03	R.	34
	S.	7 11	7 15	7 16	7 15	7 13	7 11	7 09	7 06	7 03	7 00	6 58	6 55	6 52	6 49	6 46	6 43	6 39	6 35	6 32	6 29	6 25	6 22	6 18	6 15	6 12	S.	
35	R.	4 42	4 50	4 57	5 02	5 07	5 12	5 16	5 19	5 23	5 26	5 29	5 32	5 35	5 38	5 41	5 43	5 46	5 48	5 50	5 53	5 55	5 57	5 59	6 01	6 03	R.	35
	S.	7 14	7 18	7 19	7 17	7 15	7 13	7 11	7 08	7 05	7 02	6 59	6 56	6 53	6 50	6 47	6 44	6 40	6 36	6 33	6 30	6 26	6 23	6 19	6 15	6 12	S.	
36	R.	4 39	4 47	4 54	5 00	5 06	5 09	5 14	5 17	5 21	5 25	5 28	5 31	5 34	5 37	5 40	5 42	5 45	5 47	5 50	5 52	5 54	5 57	5 59	6 01	6 03	R.	36
	S.	7 17	7 21	7 21	7 20	7 18	7 15	7 13	7 10	7 07	7 04	7 01	6 58	6 55	6 51	6 48	6 45	6 41	6 37	6 34	6 30	6 26	6 23	6 19	6 15	6 12	S.	
37	R.	4 36	4 44	4 52	4 57	5 02	5 07	5 11	5 15	5 19	5 23	5 26	5 29	5 32	5 35	5 38	5 41	5 44	5 46	5 49	5 51	5 54	5 56	5 58	6 01	6 03	R.	37
	S.	7 20	7 24	7 24	7 22	7 20	7 18	7 15	7 12	7 09	7 06	7 03	6 59	6 56	6 52	6 49	6 46	6 42	6 38	6 35	6 31	6 27	6 23	6 19	6 16	6 12	S.	
38	R.	4 33	4 41	4 49	4 55	5 00	5 05	5 09	5 13	5 17	5 21	5 24	5 28	5 31	5 34	5 37	5 40	5 43	5 46	5 48	5 51	5 53	5 56	5 58	6 00	6 02	R.	38
	S.	7 23	7 27	7 27	7 25	7 23	7 20	7 17	7 14	7 11	7 08	7 04	7 01	6 58	6 54	6 50	6 47	6 43	6 39	6 35	6 32	6 28	6 24	6 20	6 16	6 12	S.	
39	R.	4 30	4 38	4 46	4 52	4 57	5 02	5 07	5 11	5 15	5 19	5 22	5 26	5 29	5 32	5 36	5 39	5 42	5 45	5 47	5 50	5 52	5 55	5 58	6 00	6 02	R.	39
	S.	7 26	7 30	7 30	7 28	7 25	7 22	7 19	7 16	7 13	7 10	7 06	7 03	6 59	6 55	6 52	6 48	6 44	6 40	6 36	6 32	6 28	6 24	6 20	6 16	6 12	S.	
40	R.	4 27	4 35	4 43	4 49	4 55	5 00	5 05	5 09	5 13	5 17	5 21	5 24	5 28	5 31	5 35	5 38	5 41	5 44	5 47	5 50	5 52	5 55	5 57	6 00	6 02	R.	40
	S.	7 29	7 33	7 33	7 30	7 28	7 25	7 22	7 18	7 15	7 11	7 08	7 04	7 01	6 57	6 53	6 49	6 45	6 41	6 37	6 33	6 28	6 25	6 20	6 16	6 12	S.	

TABLE 10.

Mean Time of Sun's Visible Rising and Setting.

South Latitude: 41° to 60°—December 22 to March 21.

[R=Local mean time of sun's visible rising. S=Local mean time of sun's visible setting.]

Lat. S.	Approx. date.	DECEMBER.	JANUARY.						FEBRUARY.									MARCH.									Approx. date.	Lat. S.
		22	2	10	16	21	25	29	2	5	9	12	15	18	20	23	26	1	3	6	8	11	13	16	18	21		
	Dec. S.	23° 27′	23°	22°	21°	20°	19°	18°	17°	16°	15°	14°	13°	12°	11°	10°	9°	8°	7°	6°	5°	4°	3°	2°	1°	0°	Dec. S.	
°		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		°
41	R.	4 24	4 32	4 40	4 46	4 52	4 57	5 02	5 07	5 11	5 15	5 19	5 23	5 26	5 30	5 33	5 37	5 40	5 43	5 46	5 49	5 52	5 55	5 57	6 00	6 02	R.	41
	S.	7 33	7 36	7 36	7 33	7 31	7 27	7 24	7 21	7 17	7 13	7 10	7 06	7 02	6 58	6 54	6 50	6 46	6 42	6 38	6 34	6 29	6 25	6 21	6 17	6 12	S.	
42	R.	4 20	4 29	4 37	4 43	4 49	4 55	5 00	5 05	5 09	5 13	5 17	5 21	5 25	5 28	5 32	5 36	5 39	5 42	5 45	5 48	5 51	5 54	5 57	6 00	6 02	R.	42
	S.	7 36	7 39	7 39	7 36	7 33	7 30	7 27	7 23	7 19	7 15	7 12	7 08	7 04	6 59	6 55	6 51	6 47	6 42	6 38	6 34	6 29	6 25	6 21	6 17	6 12	S.	
43	R.	4 17	4 25	4 33	4 40	4 46	4 52	4 57	5 02	5 07	5 11	5 15	5 19	5 23	5 27	5 31	5 34	5 38	5 41	5 44	5 48	5 51	5 54	5 56	5 59	6 02	R.	43
	S.	7 40	7 43	7 42	7 39	7 36	7 33	7 29	7 25	7 22	7 18	7 14	7 09	7 05	7 01	6 57	6 52	6 48	6 43	6 39	6 35	6 30	6 26	6 21	6 17	6 12	S.	
44	R.	4 13	4 21	4 29	4 37	4 43	4 49	4 54	4 59	5 04	5 09	5 13	5 17	5 21	5 25	5 29	5 33	5 37	5 40	5 43	5 47	5 50	5 53	5 56	5 59	6 02	R.	44
	S.	7 44	7 47	7 46	7 43	7 39	7 36	7 32	7 28	7 24	7 20	7 16	7 11	7 07	7 02	6 58	6 53	6 49	6 44	6 40	6 36	6 31	6 26	6 22	6 17	6 13	S.	
45	R.	4 09	4 17	4 26	4 33	4 40	4 46	4 51	4 57	5 02	5 06	5 11	5 15	5 20	5 24	5 28	5 32	5 35	5 39	5 42	5 46	5 49	5 53	5 56	5 59	6 02	R.	45
	S.	7 48	7 51	7 50	7 46	7 43	7 39	7 35	7 31	7 27	7 22	7 18	7 13	7 09	7 04	7 00	6 55	6 50	6 46	6 41	6 37	6 32	6 27	6 22	6 18	6 13	S.	
46	R.	4 05	4 13	4 22	4 29	4 36	4 42	4 48	4 54	4 59	5 04	5 09	5 13	5 18	5 22	5 26	5 30	5 34	5 38	5 41	5 45	5 48	5 52	5 55	5 59	6 02	R.	46
	S.	7 52	7 55	7 54	7 50	7 46	7 42	7 38	7 34	7 29	7 24	7 20	7 15	7 10	7 05	7 01	6 56	6 51	6 47	6 42	6 37	6 32	6 27	6 22	6 18	6 13	S.	
47	R.	4 00	4 09	4 18	4 26	4 33	4 39	4 45	4 51	4 57	5 02	5 06	5 11	5 16	5 20	5 24	5 29	5 33	5 37	5 40	5 44	5 48	5 52	5 55	5 59	6 02	R.	47
	S.	7 56	7 59	7 57	7 54	7 50	7 45	7 41	7 36	7 32	7 27	7 22	7 17	7 12	7 07	7 03	6 58	6 53	6 48	6 43	6 38	6 33	6 28	6 23	6 18	6 13	S.	
48	R.	3 56	4 04	4 14	4 22	4 29	4 36	4 42	4 48	4 54	4 59	5 04	5 09	5 14	5 18	5 23	5 27	5 31	5 35	5 39	5 43	5 47	5 51	5 54	5 58	6 02	R.	48
	S.	8 01	8 03	8 01	7 57	7 53	7 49	7 44	7 39	7 35	7 30	7 25	7 19	7 14	7 09	7 05	6 59	6 54	6 49	6 44	6 39	6 33	6 28	6 23	6 18	6 13	S.	
49	R.	3 51	4 00	4 10	4 18	4 26	4 32	4 39	4 45	4 51	4 56	5 01	5 07	5 12	5 16	5 21	5 25	5 30	5 34	5 38	5 42	5 46	5 50	5 54	5 58	6 01	R.	49
	S.	8 05	8 08	8 06	8 01	7 57	7 52	7 48	7 43	7 38	7 32	7 27	7 22	7 17	7 11	7 06	7 01	6 56	6 50	6 45	6 40	6 34	6 29	6 24	6 19	6 13	S.	
50	R.	3 46	3 55	4 05	4 14	4 22	4 29	4 35	4 42	4 48	4 53	4 59	5 04	5 09	5 14	5 19	5 24	5 28	5 33	5 37	5 42	5 46	5 50	5 54	5 58	6 01	R.	50
	S	8 10	8 13	8 10	8 06	8 01	7 56	7 51	7 46	7 41	7 35	7 30	7 24	7 19	7 13	7 08	7 03	6 57	6 52	6 46	6 41	6 35	6 30	6 24	6 19	6 13	S.	
51	R.	3 41	3 50	4 01	4 09	4 17	4 25	4 32	4 38	4 44	4 50	4 56	5 02	5 07	5 12	5 17	5 22	5 27	5 31	5 36	5 41	5 45	5 49	5 53	5 57	6 01	R.	51
	S.	8 16	8 18	8 15	8 10	8 05	8 00	7 55	7 49	7 44	7 38	7 32	7 27	7 21	7 15	7 10	7 04	6 59	6 53	6 48	6 42	6 36	6 30	6 24	6 19	6 13	S.	
52	R.	3 35	3 44	3 55	4 04	4 13	4 21	4 28	4 35	4 41	4 47	4 53	4 59	5 05	5 10	5 15	5 20	5 25	5 30	5 35	5 40	5 44	5 49	5 53	5 57	6 01	R.	52
	S.	8 21	8 23	8 20	8 15	8 10	8 04	7 59	7 53	7 47	7 41	7 35	7 29	7 24	7 18	7 12	7 06	7 00	6 55	6 49	6 43	6 37	6 31	6 25	6 19	6 13	S.	
53	R.	3 29	3 38	3 50	3 59	4 08	4 16	4 24	4 31	4 38	4 44	4 50	4 56	5 02	5 08	5 13	5 18	5 23	5 28	5 33	5 38	5 43	5 48	5 52	5 57	6 01	R.	53
	S.	8 27	8 29	8 26	8 20	8 15	8 09	8 03	7 57	7 51	7 44	7 38	7 32	7 26	7 20	7 14	7 08	7 02	6 56	6 50	6 44	6 38	6 32	6 25	6 19	6 13	S.	
54	R.	3 23	3 32	3 44	3 54	4 03	4 11	4 19	4 27	4 34	4 41	4 47	4 53	4 59	5 05	5 11	5 16	5 22	5 27	5 32	5 37	5 42	5 47	5 52	5 57	6 01	R.	54
	S.	8 34	8 35	8 32	8 26	8 20	8 13	8 07	8 01	7 54	7 48	7 41	7 35	7 29	7 22	7 16	7 10	7 04	6 58	6 51	6 45	6 39	6 32	6 26	6 20	6 14	S.	
55	R.	3 16	3 25	3 38	3 48	3 57	4 06	4 15	4 23	4 30	4 37	4 44	4 50	4 57	5 03	5 09	5 14	5 20	5 25	5 31	5 36	5 41	5 46	5 51	5 56	6 01	R.	55
	S.	8 41	8 42	8 38	8 31	8 25	8 18	8 12	8 05	7 58	7 51	7 45	7 38	7 32	7 25	7 19	7 12	7 06	6 59	6 53	6 46	6 40	6 33	6 26	6 20	6 14	S.	
56	R.	3 08	3 18	3 31	3 42	3 52	4 01	4 10	4 18	4 26	4 33	4 40	4 47	4 54	5 00	5 06	5 12	5 18	5 24	5 29	5 35	5 40	5 46	5 51	5 56	6 01	R.	56
	S.	8 48	8 49	8 44	8 37	8 30	8 23	8 17	8 10	8 03	7 56	7 49	7 42	7 35	7 28	7 21	7 14	7 08	7 01	6 54	6 48	6 41	6 34	6 27	6 21	6 14	S.	
57	R.	3 00	3 11	3 24	3 35	3 45	3 55	4 04	4 13	4 21	4 29	4 36	4 43	4 50	4 57	5 03	5 10	5 16	5 22	5 28	5 34	5 39	5 45	5 50	5 55	6 00	R.	57
	S.	8 56	8 57	8 51	8 44	8 37	8 29	8 22	8 15	8 07	8 00	7 52	7 45	7 38	7 31	7 24	7 17	7 10	7 03	6 56	6 49	6 42	6 35	6 28	6 21	6 14	S.	
58	R.	2 51	3 02	3 16	3 28	3 39	3 49	3 59	4 08	4 16	4 24	4 32	4 40	4 47	4 54	5 01	5 07	5 14	5 20	5 26	5 32	5 38	5 44	5 49	5 55	6 00	R.	58
	S.	9 05	9 06	8 59	8 51	8 43	8 35	8 27	8 20	8 12	8 04	7 56	7 49	7 42	7 34	7 27	7 19	7 12	7 05	6 57	6 50	6 43	6 36	6 29	6 22	6 14	S.	
59	R.	2 42	2 53	3 08	3 20	3 32	3 43	3 53	4 02	4 11	4 19	4 28	4 36	4 43	4 50	4 58	5 05	5 11	5 18	5 24	5 31	5 37	5 43	5 48	5 54	6 00	R.	59
	S.	9 15	9 15	9 08	8 59	8 50	8 42	8 33	8 25	8 17	8 09	8 01	7 53	7 45	7 37	7 30	7 22	7 14	7 07	6 59	6 52	6 44	6 37	6 29	6 22	6 15	S.	
60	R.	2 31	2 42	2 59	3 13	3 25	3 36	3 47	3 57	4 06	4 15	4 23	4 32	4 40	4 47	4 55	5 02	5 09	5 16	5 22	5 29	5 35	5 42	5 48	5 54	6 00	R.	60
	S.	9 26	9 26	9 17	9 07	8 58	8 49	8 40	8 31	8 23	8 14	8 05	7 57	7 49	7 40	7 32	7 24	7 16	7 09	7 01	6 53	6 45	6 38	6 30	6 23	6 15	S.	

TABLE 11.

For reducing the Time of the Moon's passage over the Meridian of Greenwich to the Time of its passage over any other Meridian. The numbers taken from this Table are to be added to the Time at Greenwich in West Longitude, subtracted in East Longitude.

Longitude.	Daily variation of the moon's passing the meridian.														Longitude.
	40^m	42^m	44^m	46^m	48^m	50^m	52^m	54^m	56^m	58^m	60^m	62^m	64^m	66^m	
°	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	°
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5
10	1	1	1	1	1	1	1	1	2	2	2	2	2	2	10
15	2	2	2	3	2	2	2	2	2	2	2	3	3	3	15
20	2	2	2	2	3	3	3	3	3	3	3	3	4	4	20
25	3	3	3	3	3	3	4	4	4	4	4	4	4	5	25
30	3	3	4	4	4	4	4	4	5	5	5	5	5	5	30
35	4	4	4	4	5	5	5	5	5	6	6	6	6	6	35
40	4	5	5	5	5	6	6	6	6	6	7	7	7	7	40
45	5	5	5	6	6	6	6	7	7	7	7	8	8	8	45
50	6	6	6	6	7	7	7	7	8	8	8	9	9	9	50
55	6	6	7	7	7	8	8	8	9	9	9	9	10	10	55
60	7	7	7	8	8	8	9	9	9	10	10	10	11	11	60
65	7	8	8	8	9	9	9	10	10	10	11	11	12	12	65
70	8	8	9	9	9	10	10	10	11	11	12	12	12	13	70
75	8	9	9	10	10	10	11	11	12	12	12	13	13	14	75
80	9	9	10	10	11	11	12	12	12	13	13	14	14	15	80
85	9	10	10	11	11	12	12	13	13	14	14	15	15	16	85
90	10	10	11	11	12	12	13	13	14	14	15	15	16	16	90
95	11	11	12	12	13	13	14	14	15	15	16	16	17	17	95
100	11	12	12	13	13	14	14	15	16	16	17	17	18	18	100
105	12	12	13	13	14	15	15	16	16	17	17	18	19	19	105
110	12	13	13	14	15	15	16	16	17	18	18	19	20	20	110
115	13	13	14	15	15	16	17	17	18	19	19	20	20	21	115
120	13	14	15	15	16	17	17	18	19	19	20	21	21	22	120
125	14	15	15	16	17	17	18	19	19	20	21	22	22	23	125
130	14	15	16	17	17	18	19	19	20	21	22	22	23	24	130
135	15	16	16	17	18	19	19	20	21	22	22	23	24	25	135
140	16	16	17	18	19	19	20	21	22	23	23	24	25	26	140
145	16	17	18	19	19	20	21	22	23	23	24	25	26	27	145
150	17	17	18	19	20	21	22	22	23	24	25	26	27	27	150
155	17	18	19	20	21	22	22	23	24	25	26	27	28	28	155
160	18	19	20	20	21	22	23	24	25	26	27	28	28	29	160
165	18	19	20	21	22	23	24	25	26	27	27	28	29	30	165
170	19	20	21	22	23	24	25	25	26	27	28	29	30	31	170
175	19	20	21	22	23	24	25	26	27	28	29	30	31	32	175
180	20	21	22	23	24	25	26	27	28	29	30	31	32	33	180
	40^m	42^m	44^m	46^m	48^m	50^m	52^m	54^m	56^m	58^m	60^m	62^m	64^m	66^m	

TABLE 12.

For finding the Variation of the Sun's Right Ascension or Declination, or of the Equation of Time, in any number of minutes of time, the Horary Motion being given at the top of the page in seconds, and the number of minutes of time in the side column. Also for finding the Variation of the Moon's Declination or Right Ascension in seconds of time, the motion in one minute being given at the top, and the numbers in the side column being taken for seconds.

M.	Horary motion.																			M.
	1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	11"	12"	13"	14"	15"	16"	17"	18"	19"	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2
3	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	3
4	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	4
5	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	2	5
6	0	0	0	0	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	6
7	0	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	7
8	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	8
9	0	0	0	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	9
10	0	0	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	10
11	0	0	1	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	3	11
12	0	0	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	4	4	12
13	0	0	1	1	1	1	2	2	2	2	2	3	3	3	3	3	4	4	4	13
14	0	0	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	4	14
15	0	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	5	5	15
16	0	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	5	5	5	16
17	0	1	1	1	1	2	2	2	3	3	3	3	4	4	4	5	5	5	5	17
18	0	1	1	1	2	2	2	2	3	3	3	4	4	4	5	5	5	5	6	18
19	0	1	1	1	2	2	2	3	3	3	3	4	4	4	5	5	5	6	6	19
20	0	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	20
21	0	1	1	1	2	2	2	3	3	4	4	4	5	5	5	6	6	6	7	21
22	0	1	1	1	2	2	3	3	3	4	4	4	5	5	6	6	6	7	7	22
23	0	1	1	2	2	2	3	3	3	4	4	5	5	5	6	6	7	7	7	23
24	0	1	1	2	2	2	3	3	4	4	4	5	5	6	6	6	7	7	8	24
25	0	1	1	2	2	3	3	3	4	4	5	5	5	6	6	7	7	8	8	25
26	0	1	1	2	2	3	3	3	4	4	5	5	6	6	7	7	7	8	8	26
27	0	1	1	2	2	3	3	4	4	5	5	5	6	6	7	7	8	8	9	27
28	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	7	8	8	9	28
29	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	29
30	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	30
31	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	31
32	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	9	9	10	10	32
33	1	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	9	10	10	33
34	1	1	2	2	3	3	4	5	5	6	6	7	7	8	9	9	10	10	11	34
35	1	1	2	2	3	4	4	5	5	6	6	7	8	8	9	9	10	11	11	35
36	1	1	2	2	3	4	4	5	5	6	7	7	8	8	9	10	10	11	11	36
37	1	1	2	2	3	4	4	5	6	6	7	7	8	9	9	10	10	11	12	37
38	1	1	2	3	3	4	4	5	6	6	7	8	8	9	10	10	11	11	12	38
39	1	1	2	3	3	4	5	5	6	7	7	8	8	9	10	10	11	12	12	39
40	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	11	11	12	13	40
41	1	1	2	3	3	4	5	5	6	7	8	8	9	10	10	11	12	12	13	41
42	1	1	2	3	4	4	5	6	6	7	8	8	9	10	11	11	12	13	13	42
43	1	1	2	3	4	4	5	6	6	7	8	9	9	10	11	11	12	13	14	43
44	1	1	2	3	4	4	5	6	7	7	8	9	10	10	11	12	12	13	14	44
45	1	2	2	3	4	5	5	6	7	8	8	9	10	11	11	12	13	14	14	45
46	1	2	2	3	4	5	5	6	7	8	8	9	10	11	12	12	13	14	15	46
47	1	2	2	3	4	5	5	6	7	8	9	9	10	11	12	13	13	14	15	47
48	1	2	2	3	4	5	6	6	7	8	9	10	10	11	12	13	14	14	15	48
49	1	2	2	3	4	5	6	7	7	8	9	10	11	11	12	13	14	15	16	49
50	1	2	3	3	4	5	6	7	8	8	9	10	11	12	13	13	14	15	16	50
51	1	2	3	3	4	5	6	7	8	9	9	10	11	12	13	14	14	15	16	51
52	1	2	3	3	4	5	6	7	8	9	10	10	11	12	13	14	15	16	16	52
53	1	2	3	4	4	5	6	7	8	9	10	11	11	12	13	14	15	16	17	53
54	1	2	3	4	5	5	6	7	8	9	10	11	12	13	14	14	15	16	17	54
55	1	2	3	4	5	6	6	7	8	9	10	11	12	13	14	15	16	17	17	55
56	1	2	3	4	5	6	7	7	8	9	10	11	12	13	14	15	16	17	18	56
57	1	2	3	4	5	6	7	8	9	10	10	11	12	13	14	15	16	17	18	57
58	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	15	16	17	18	58
59	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	59
60	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	60

TABLE 12.

For finding the Variation of the Sun's Right Ascension or Declination, or of the Equation of Time, in any number of minutes of time, the Horary Motion being given at the top of the page in seconds, and the number of minutes of time in the side column. Also for finding the Variation of the Moon's Declination or Right Ascension in seconds of time, the motion in one minute being given at the top, and the numbers in the side column being taken for seconds.

M.	Horary motion.																	M.
	20″	21″	22″	23″	24″	25″	26″	27″	28″	29″	30″	31″	32″	33″	34″	35″	36″	
1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
3	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3
4	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4
5	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	5
6	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	4	4	6
7	2	2	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	7
8	3	3	3	3	3	3	3	4	4	4	4	4	4	4	5	5	5	8
9	3	3	3	3	4	4	4	4	4	4	5	5	5	5	5	5	5	9
10	3	4	4	4	4	4	4	5	5	5	5	5	5	6	6	6	6	10
11	4	4	4	4	4	5	5	5	5	5	6	6	6	6	6	6	7	11
12	4	4	4	5	5	5	5	5	6	6	6	6	6	7	7	7	7	12
13	4	5	5	5	5	5	6	6	6	6	7	7	7	7	7	8	8	13
14	5	5	5	5	6	6	6	6	7	7	7	7	7	8	8	8	8	14
15	5	5	6	6	6	6	7	7	7	7	8	8	8	8	9	9	9	15
16	5	6	6	6	6	7	7	7	7	8	8	8	9	9	9	9	10	16
17	6	6	6	7	7	7	7	8	8	8	9	9	9	9	10	10	10	17
18	6	6	7	7	7	8	8	8	8	9	9	9	10	10	10	11	11	18
19	6	7	7	7	8	8	8	9	9	9	10	10	10	10	11	11	11	19
20	7	7	7	8	8	8	9	9	9	10	10	10	11	11	11	12	12	20
21	7	7	8	8	8	9	9	9	10	10	11	11	11	12	12	12	13	21
22	7	8	8	8	9	9	10	10	10	11	11	11	12	12	12	13	13	22
23	8	8	8	9	9	10	10	10	11	11	12	12	12	13	13	13	14	23
24	8	8	9	9	10	10	10	11	11	12	12	12	13	13	14	14	14	24
25	8	9	9	10	10	10	11	11	12	12	13	13	13	14	14	15	15	25
26	9	9	10	10	10	11	11	12	12	13	13	13	14	14	15	15	16	26
27	9	9	10	10	11	11	12	12	13	13	14	14	14	15	15	16	16	27
28	9	10	10	11	11	12	12	13	13	14	14	14	15	15	16	16	17	28
29	10	10	11	11	12	12	13	13	14	14	15	15	15	16	16	17	17	29
30	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	18	18	30
31	10	11	11	12	12	13	13	14	14	15	16	16	17	17	18	18	19	31
32	11	11	12	12	13	13	14	14	15	15	16	17	17	18	18	19	19	32
33	11	12	12	13	13	14	14	15	15	16	17	17	18	18	19	19	20	33
34	11	12	12	13	14	14	15	15	16	16	17	18	18	19	19	20	20	34
35	12	12	13	13	14	15	15	16	16	17	18	18	19	19	20	20	21	35
36	12	13	13	14	14	15	16	16	17	17	18	19	19	20	20	21	22	36
37	12	13	14	14	15	15	16	17	17	18	19	19	20	20	21	22	22	37
38	13	13	14	15	15	16	16	17	18	18	19	20	20	21	22	22	23	38
39	13	14	14	15	16	16	17	18	18	19	20	20	21	21	22	23	23	39
40	13	14	15	15	16	17	17	18	19	19	20	21	21	22	23	23	24	40
41	14	14	15	16	16	17	18	18	19	20	21	21	22	23	23	24	25	41
42	14	15	15	16	17	18	18	19	20	20	21	22	22	23	24	25	25	42
43	14	15	16	16	17	18	19	19	20	21	22	22	23	24	24	25	26	43
44	15	15	16	17	18	18	19	20	21	21	22	23	23	24	25	26	26	44
45	15	16	17	17	18	19	20	20	21	22	23	23	24	25	26	26	27	45
46	15	16	17	18	18	19	20	21	21	22	23	24	25	25	26	27	28	46
47	16	16	17	18	19	20	20	21	22	23	24	24	25	26	27	27	28	47
48	16	17	18	18	19	20	21	22	22	23	24	25	26	26	27	28	29	48
49	16	17	18	19	20	20	21	22	23	24	25	25	26	27	28	29	29	49
50	17	18	18	19	20	21	22	23	23	24	25	26	27	28	28	29	30	50
51	17	18	19	20	20	21	22	23	24	25	26	26	27	28	29	30	31	51
52	17	18	19	20	21	22	23	23	24	25	26	27	28	29	29	30	31	52
53	18	19	19	20	21	22	23	24	25	26	27	27	28	29	30	31	32	53
54	18	19	20	21	22	23	23	24	25	26	27	28	29	30	31	32	32	54
55	18	19	20	21	22	23	24	25	26	27	28	28	29	30	31	32	33	55
56	19	20	21	21	22	23	24	25	26	27	28	29	30	31	32	33	34	56
57	19	20	21	22	23	24	25	26	27	28	29	29	30	31	32	33	34	57
58	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	58
59	20	21	22	23	24	25	26	27	28	29	30	30	31	32	33	34	35	59
60	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	60

TABLE 12.

For finding the Variation of the Sun's Right Ascension or Declination, or of the Equation of Time, in any number of minutes of time, the Horary Motion being given at the top of the page in seconds, and the number of minutes of time in the side column. Also for finding the Variation of the Moon's Declination or Right Ascension in seconds of time, the motion in one minute being given at the top, and the numbers in the side column being taken for seconds.

M.	Horary motion.																	M.
	37″	38″	39″	40″	41″	42″	43″	44″	45″	46″	47″	48″	49″	50″	51″	52″	53″	
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2
3	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3
4	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4
5	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	5
6	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	6
7	4	4	5	5	5	5	5	5	5	5	5	6	6	6	6	6	6	7
8	5	5	5	5	5	6	6	6	6	6	6	6	7	7	7	7	7	8
9	6	6	6	6	6	6	6	7	7	7	7	7	7	8	8	8	8	9
10	6	6	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	10
11	7	7	7	7	8	8	8	8	8	8	9	9	9	9	9	10	10	11
12	7	8	8	8	8	8	9	9	9	9	9	10	10	10	10	10	11	12
13	8	8	8	9	9	9	9	10	10	10	10	10	11	11	11	11	11	13
14	9	9	9	9	10	10	10	10	11	11	11	11	11	12	12	12	12	14
15	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	15
16	10	10	10	11	11	11	11	12	12	12	13	13	13	13	14	14	14	16
17	10	11	11	11	12	12	12	12	13	13	13	14	14	14	14	15	15	17
18	11	11	12	12	12	13	13	13	14	14	14	14	15	15	15	16	16	18
19	12	12	12	13	13	13	14	14	14	15	15	15	16	16	16	16	17	19
20	12	13	13	13	14	14	14	15	15	15	16	16	16	17	17	17	18	20
21	13	13	14	14	14	15	15	15	16	16	16	17	17	18	18	18	19	21
22	14	14	14	15	15	15	16	16	17	17	17	18	18	18	19	19	19	22
23	14	15	15	15	16	16	16	17	17	18	18	18	19	19	20	20	20	23
24	15	15	16	16	16	17	17	18	18	18	19	19	20	20	20	21	21	24
25	15	16	16	17	17	18	18	18	19	19	20	20	20	21	21	22	22	25
26	16	16	17	17	18	18	19	19	20	20	20	21	21	22	22	23	23	26
27	17	17	18	18	18	19	19	20	20	21	21	22	22	23	23	23	24	27
28	17	18	18	19	19	20	20	21	21	21	22	22	23	23	24	24	25	28
29	18	18	19	19	20	20	21	21	22	22	23	23	24	24	25	25	26	29
30	19	19	20	20	21	21	22	22	23	23	24	24	25	25	26	26	27	30
31	19	20	20	21	21	22	22	23	23	24	24	25	25	26	26	27	27	31
32	20	20	21	21	22	22	23	23	24	25	25	26	26	27	27	28	28	32
33	20	21	21	22	23	23	24	24	25	25	26	26	27	28	28	29	29	33
34	21	22	22	23	23	24	24	25	26	26	27	27	28	28	29	29	30	34
35	22	22	23	23	24	25	25	26	26	27	27	28	29	29	30	30	31	35
36	22	23	23	24	25	25	26	26	27	28	28	29	29	30	31	31	32	36
37	23	23	24	25	25	26	27	27	28	28	29	30	30	31	31	32	33	37
38	23	24	25	25	26	27	27	28	29	29	30	30	31	32	32	33	34	38
39	24	25	25	26	27	27	28	29	29	30	31	31	32	33	33	34	34	39
40	25	25	26	27	27	28	29	29	30	31	31	32	33	33	34	35	35	40
41	25	26	27	27	28	29	29	30	31	31	32	33	33	34	35	36	36	41
42	26	27	27	28	29	29	30	31	32	32	33	34	34	35	36	36	37	42
43	27	27	28	29	29	30	31	32	32	33	34	34	35	36	37	37	38	43
44	27	28	29	29	30	31	32	32	33	34	34	35	36	37	37	38	39	44
45	28	29	29	30	31	32	32	33	34	35	35	36	37	38	38	39	40	45
46	28	29	30	31	31	32	33	34	35	35	36	37	38	38	39	40	41	46
47	29	30	31	31	32	33	34	34	35	36	37	38	38	39	40	41	42	47
48	30	30	31	32	33	34	34	35	36	37	38	38	39	40	41	42	42	48
49	30	31	32	33	33	34	35	36	37	38	38	39	40	41	42	42	43	49
50	31	32	33	33	34	35	36	37	38	38	39	40	41	42	43	43	44	50
51	31	32	33	34	35	36	37	37	38	39	40	41	42	43	43	44	45	51
52	32	33	34	35	36	36	37	38	39	40	41	42	42	43	44	45	46	52
53	33	34	34	35	36	37	38	39	40	41	42	42	43	44	45	46	47	53
54	33	34	35	36	37	38	39	40	41	41	42	43	44	45	46	47	48	54
55	34	35	36	37	38	39	39	40	41	42	43	44	45	46	47	48	49	55
56	35	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	49	56
57	35	36	37	38	39	40	41	42	43	44	45	46	47	48	48	49	50	57
58	36	37	38	39	40	41	42	43	44	44	45	46	47	48	49	50	51	58
59	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	59
60	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	60

TABLE 12.

For finding the Variation of the Sun's Right Ascension or Declination, or of the Equation of Time, in any number of minutes of time, the Horary Motion being given at the top of the page in seconds, and the number of minutes of time in the side column. Also for finding the Variation of the Moon's Declination or Right Ascension in seconds of time, the motion in one minute being given at the top, and the numbers in the side column being taken for seconds.

M.	Horary motion.																	M.
	54″	55″	56″	57″	58″	59″	60″	61″	62″	63″	64″	65″	66″	67″	68″	69″	70″	
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	4
5	5	5	5	5	5	5	5	5	5	5	5	5	6	6	6	6	6	5
6	5	6	6	6	6	6	6	6	6	6	6	7	7	7	7	7	7	6
7	6	6	7	7	7	7	7	7	7	7	7	8	8	8	8	8	8	7
8	7	7	7	8	8	8	8	8	8	8	9	9	9	9	9	9	9	8
9	8	8	8	9	9	9	9	9	9	9	10	10	10	10	10	10	11	9
10	9	9	9	10	10	10	10	10	10	11	11	11	11	11	11	12	12	10
11	10	10	10	10	11	11	11	11	11	12	12	12	12	12	12	13	13	11
12	11	11	11	11	12	12	12	12	12	13	13	13	13	13	14	14	14	12
13	12	12	12	12	13	13	13	13	13	14	14	14	14	15	15	15	15	13
14	13	13	13	13	14	14	14	14	14	15	15	15	15	16	16	16	16	14
15	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17	18	15
16	14	15	15	15	15	16	16	16	17	17	17	17	18	18	18	18	19	16
17	15	16	16	16	16	17	17	17	18	18	18	18	19	19	19	20	20	17
18	16	17	17	17	17	18	18	18	19	19	19	20	20	20	20	21	21	18
19	17	17	18	18	18	19	19	19	20	20	20	21	21	21	22	22	22	19
20	18	18	19	19	19	20	20	20	21	21	21	22	22	22	23	23	23	20
21	19	19	20	20	20	21	21	21	22	22	22	23	23	23	24	24	25	21
22	20	20	21	21	21	22	22	22	23	23	23	24	24	25	25	25	26	22
23	21	21	21	22	22	23	23	23	24	24	25	25	25	26	26	26	27	23
24	22	22	22	23	23	24	24	24	25	25	26	26	26	27	27	28	28	24
25	23	23	23	24	24	25	25	25	26	26	27	27	28	28	28	29	29	25
26	23	24	24	25	25	26	26	26	27	27	28	28	29	29	29	30	30	26
27	24	25	25	26	26	27	27	27	28	28	29	29	30	30	31	31	32	27
28	25	26	26	27	27	28	28	28	29	29	30	30	31	31	32	32	33	28
29	26	27	27	28	28	29	29	29	30	30	31	31	32	32	33	33	34	29
30	27	28	28	29	29	30	30	31	31	32	32	33	33	34	34	35	35	30
31	28	28	29	29	30	30	31	32	32	33	33	34	34	35	35	36	36	31
32	29	29	30	30	31	31	32	33	33	34	34	35	35	36	36	37	37	32
33	30	30	31	31	32	32	33	34	34	35	35	36	36	37	37	38	39	33
34	31	31	32	32	33	33	34	35	35	36	36	37	37	38	39	39	40	34
35	32	32	33	33	34	34	35	36	36	37	37	38	39	39	40	40	41	35
36	32	33	34	34	35	35	36	37	37	38	38	39	40	40	41	41	42	36
37	33	34	35	35	36	36	37	38	38	39	39	40	41	41	42	43	43	37
38	34	35	35	36	37	37	38	39	39	40	41	41	42	42	43	44	44	38
39	35	36	36	37	38	38	39	40	40	41	42	42	43	44	44	45	46	39
40	36	37	37	38	39	39	40	41	41	42	43	43	44	45	45	46	47	40
41	37	38	38	39	40	40	41	42	42	43	44	44	45	46	46	47	48	41
42	38	39	39	40	41	41	42	43	43	44	45	46	46	47	48	48	49	42
43	39	39	40	41	42	42	43	44	44	45	46	47	47	48	49	49	50	43
44	40	40	41	42	43	43	44	45	45	46	47	48	48	49	50	51	51	44
45	41	41	42	43	44	44	45	46	47	47	48	49	50	50	51	52	53	45
46	41	42	43	44	44	45	46	47	48	48	49	50	51	51	52	53	54	46
47	42	43	44	45	45	46	47	48	49	49	50	51	52	52	53	54	55	47
48	43	44	45	46	46	47	48	49	50	50	51	52	53	54	54	55	56	48
49	44	45	46	47	47	48	49	50	51	51	52	53	54	55	56	56	57	49
50	45	46	47	48	48	49	50	51	52	53	53	54	55	56	57	58	58	50
51	46	47	48	48	49	50	51	52	53	54	54	55	56	57	58	59	60	51
52	47	48	49	49	50	51	52	53	54	55	55	56	57	58	59	60	61	52
53	48	49	49	50	51	52	53	54	55	56	57	57	58	59	60	61	62	53
54	49	50	50	51	52	53	54	55	56	57	58	59	59	60	61	62	63	54
55	50	50	51	52	53	54	55	56	57	58	59	60	61	61	62	63	64	55
56	50	51	52	53	54	55	56	57	58	59	60	61	62	63	63	64	65	56
57	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	57
58	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	58
59	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	59
60	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	60

TABLE 12.

For finding the Variation of the Sun's Right Ascension or Declination, or of the Equation of Time, in any number of minutes of time, the Horary Motion being given at the top of the page in seconds, and the number of minutes of time in the side column. Also for finding the Variation of the Moon's Declination or Right Ascension in seconds of time, the motion in one minute being given at the top, and the numbers in the side column being taken for seconds.

M.	Horary motion.																	M.
	71″	72″	73″	74″	75″	76″	77″	78″	79″	80″	81″	82″	83″	84″	85″	86″	87″	
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	2
3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3
4	5	5	5	5	5	5	5	5	5	5	5	5	6	6	6	6	6	4
5	6	6	6	6	6	6	6	7	7	7	7	7	7	7	7	7	7	5
6	7	7	7	7	8	8	8	8	8	8	8	8	8	8	9	9	9	6
7	8	8	9	9	9	9	9	9	9	9	9	10	10	10	10	10	10	7
8	9	10	10	10	10	10	10	10	11	11	11	11	11	11	11	11	12	8
9	11	11	11	11	11	11	12	12	12	12	12	12	12	13	13	13	13	9
10	12	12	12	12	13	13	13	13	13	13	14	14	14	14	14	14	15	10
11	13	13	13	14	14	14	14	14	14	15	15	15	15	15	16	16	16	11
12	14	14	15	15	15	15	15	16	16	16	16	16	17	17	17	17	17	12
13	15	16	16	16	16	16	17	17	17	17	18	18	18	18	18	19	19	13
14	17	17	17	17	18	18	18	18	18	19	19	19	19	20	20	20	20	14
15	18	18	18	19	19	19	19	20	20	20	20	21	21	21	21	22	22	15
16	19	19	19	20	20	20	21	21	21	21	22	22	22	22	23	23	23	16
17	20	20	21	21	21	22	22	22	22	23	23	23	24	24	24	24	25	17
18	21	22	22	22	23	23	23	23	24	24	24	25	25	25	26	26	26	18
19	22	23	23	23	24	24	24	25	25	25	26	26	26	27	27	27	28	19
20	24	24	24	25	25	25	26	26	26	27	27	27	28	28	28	29	29	20
21	25	25	26	26	26	27	27	27	28	28	28	29	29	29	30	30	30	21
22	26	26	27	27	28	28	28	29	29	29	30	30	30	31	31	32	32	22
23	27	28	28	28	29	29	30	30	30	31	31	31	32	32	33	33	33	23
24	28	29	29	30	30	30	31	31	32	32	32	33	33	34	34	34	34	24
25	30	30	30	31	31	32	32	33	33	33	34	34	35	35	35	36	36	25
26	31	31	32	32	33	33	33	34	34	35	35	36	36	36	37	37	38	26
27	32	32	33	33	34	34	35	35	36	36	36	37	37	38	38	39	39	27
28	33	34	34	35	35	35	36	36	37	37	38	38	39	39	40	40	41	28
29	34	35	35	36	36	37	37	38	38	39	39	40	40	41	41	42	42	29
30	36	36	37	37	38	38	39	39	40	40	41	41	42	42	43	43	44	30
31	37	37	38	38	39	39	40	40	41	41	42	42	43	43	44	44	45	31
32	38	38	39	39	40	41	41	42	42	43	43	44	44	45	45	46	46	32
33	39	40	40	41	41	42	42	43	43	44	45	45	46	46	47	47	48	33
34	40	41	41	42	43	43	44	44	45	45	46	46	47	48	48	49	49	34
35	41	42	43	43	44	44	45	46	46	47	47	48	48	49	50	50	51	35
36	43	43	44	44	45	46	46	47	47	48	49	49	50	50	51	52	52	36
37	44	44	45	46	46	47	47	48	49	49	50	51	51	52	52	53	54	37
38	45	46	46	47	48	48	49	49	50	51	51	52	53	53	54	54	55	38
39	46	47	47	48	49	49	50	51	51	52	53	53	54	55	55	56	57	39
40	47	48	49	49	50	51	51	52	53	53	54	55	55	56	57	57	58	40
41	49	49	50	51	51	52	53	53	54	55	55	56	57	57	58	59	59	41
42	50	50	51	52	53	53	54	55	55	56	57	57	58	59	60	60	61	42
43	51	52	52	53	54	54	55	56	57	57	58	59	59	60	61	62	62	43
44	52	53	54	54	55	56	56	57	58	59	59	60	61	62	62	63	64	44
45	53	54	55	56	56	57	58	59	59	60	61	62	62	63	64	65	65	45
46	54	55	56	57	58	58	59	60	61	61	62	63	64	64	65	66	67	46
47	56	56	57	58	59	60	60	61	62	63	63	64	65	66	67	67	68	47
48	57	58	58	59	60	61	62	62	63	64	65	66	66	67	68	69	70	48
49	58	59	60	60	61	62	63	64	65	65	66	67	68	69	69	70	71	49
50	59	60	61	62	63	63	64	65	66	67	68	68	69	70	71	72	73	50
51	60	61	62	63	64	65	65	66	67	68	69	70	71	71	72	73	74	51
52	62	62	63	64	65	66	67	68	68	69	70	71	72	73	74	75	75	52
53	63	64	64	65	66	67	68	69	70	71	72	72	73	74	75	76	77	53
54	64	65	66	67	68	68	69	70	71	72	73	74	75	76	77	77	78	54
55	65	66	67	68	69	70	71	72	72	73	74	75	76	77	78	79	80	55
56	66	67	68	69	70	71	72	73	74	75	76	77	77	78	79	80	81	56
57	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	57
58	69	70	71	72	73	73	74	75	76	77	78	79	80	81	82	83	84	58
59	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	59
60	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	60

TABLE 12.

For finding the Variation of the Sun's Right Ascension or Declination, or of the Equation of Time, in any number of minutes of time, the Horary Motion being given at the top of the page in seconds, and the number of minutes of time in the side column. Also for finding the Variation of the Moon's Declination or Right Ascension, in seconds of time, the motion in one minute being given at the top and the numbers in the side column being taken for seconds.

M.	Horary motion.																	M.
	88″	89″	90″	91″	92″	93″	94″	95″	96″	97″	98″	99″	100″	101″	102″	103″	104″	
1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
3	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3
4	6	6	6	6	6	6	6	6	6	6	7	7	7	7	7	7	7	4
5	7	7	8	8	8	8	8	8	8	8	8	8	8	8	9	9	9	5
6	9	9	9	9	9	9	9	10	10	10	10	10	10	10	10	10	10	6
7	10	10	11	11	11	11	11	11	11	11	11	12	12	12	12	12	12	7
8	12	12	12	12	12	12	13	13	13	13	13	13	13	13	14	14	14	8
9	13	13	14	14	14	14	14	14	14	15	15	15	15	15	15	15	16	9
10	15	15	15	15	15	16	16	16	16	16	16	17	17	17	17	17	17	10
11	16	16	17	17	17	17	17	17	18	18	18	18	18	19	19	19	19	11
12	18	18	18	18	18	19	19	19	19	19	20	20	20	20	20	21	21	12
13	19	19	20	20	20	20	20	21	21	21	21	21	22	22	22	22	23	13
14	21	21	21	21	21	22	22	22	22	23	23	23	23	24	24	24	24	14
15	22	22	23	23	23	23	24	24	24	24	25	25	25	25	26	26	26	15
16	23	24	24	24	25	25	25	25	26	26	26	26	27	27	27	27	28	16
17	25	25	26	26	26	26	27	27	27	27	28	28	28	29	29	29	29	17
18	26	27	27	27	28	28	28	29	29	29	29	30	30	30	31	31	31	18
19	28	28	29	29	29	29	30	30	30	31	31	31	32	32	32	33	33	19
20	29	30	30	30	31	31	31	32	32	32	33	33	33	34	34	34	35	20
21	31	31	32	32	32	33	33	33	34	34	34	35	35	35	36	36	36	21
22	32	33	33	33	34	34	34	35	35	36	36	36	37	37	37	38	38	22
23	34	34	35	35	35	36	36	36	37	37	38	38	38	39	39	39	40	23
24	35	36	36	36	37	37	38	38	38	39	39	40	40	40	41	41	42	24
25	37	37	38	38	38	39	39	40	40	40	41	41	42	42	43	43	43	25
26	38	39	39	39	40	40	41	41	42	42	42	43	43	44	44	45	45	26
27	40	40	41	41	41	42	42	43	43	44	44	45	45	45	46	46	47	27
28	41	42	42	42	43	43	44	44	45	45	46	46	47	47	48	48	49	28
29	43	43	44	44	44	45	45	46	46	47	47	48	48	49	49	50	50	29
30	44	45	45	46	46	47	47	48	48	49	49	50	50	51	51	52	52	30
31	45	46	47	47	48	48	49	49	50	50	51	51	52	52	53	53	54	31
32	47	47	48	49	49	50	50	51	51	52	52	53	53	54	54	55	55	32
33	48	49	50	50	51	51	52	52	53	53	54	54	55	56	56	57	57	33
34	50	50	51	52	52	53	53	54	54	55	56	56	57	57	58	58	59	34
35	51	52	53	53	54	54	55	55	56	57	57	58	58	59	60	60	61	35
36	53	53	54	55	55	56	56	57	58	58	59	59	60	61	61	62	62	36
37	54	55	56	56	57	57	58	59	59	60	60	61	62	62	63	64	64	37
38	56	56	57	58	58	59	60	60	61	61	62	63	63	64	65	65	66	38
39	57	58	59	59	60	60	61	62	62	63	64	64	65	66	66	67	68	39
40	59	59	60	61	61	62	63	63	64	65	65	66	67	67	68	69	69	40
41	60	61	62	62	63	64	64	65	66	66	67	68	68	69	70	70	71	41
42	62	62	63	64	64	65	66	67	67	68	69	69	70	71	71	72	73	42
43	63	64	65	65	66	67	67	68	69	70	70	71	72	72	73	74	75	43
44	65	65	66	67	67	68	69	70	70	71	72	73	73	74	75	76	76	44
45	66	67	68	68	69	70	71	71	72	73	74	74	75	76	77	77	78	45
46	67	68	69	70	71	71	72	73	74	74	75	76	77	77	78	79	80	46
47	69	70	71	71	72	73	74	74	75	76	77	78	78	79	80	81	81	47
48	70	71	72	73	74	74	75	76	77	78	78	79	80	81	82	82	83	48
49	72	73	74	74	75	76	77	78	78	79	80	81	82	82	83	84	85	49
50	73	74	75	76	77	78	78	79	80	81	82	83	83	84	85	86	87	50
51	75	76	77	77	78	79	80	81	82	82	83	84	85	86	87	88	88	51
52	76	77	78	79	80	81	81	82	83	84	85	86	87	88	88	89	90	52
53	78	79	80	80	81	82	83	84	85	86	87	87	88	89	90	91	92	53
54	79	80	81	82	83	84	85	86	86	87	88	89	90	91	92	93	94	54
55	81	82	83	83	84	85	86	87	88	89	90	91	92	93	94	94	95	55
56	82	83	84	85	86	87	88	89	90	91	91	92	93	94	95	96	97	56
57	84	85	86	86	87	88	89	90	91	92	93	94	95	96	97	98	99	57
58	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	58
59	87	88	89	90	90	91	92	93	94	95	96	97	98	99	100	101	102	59
60	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	60

TABLE 12.

For finding the Variation of the Sun's Right Ascension or Declination, or of the Equation of Time, in any number of minutes of time, the Horary Motion being given at the top of the page in seconds, and the number of minutes of time in the side column. Also for finding the Variatior of the Moon's Declination or Right Ascension, in seconds of time, the motion in one minute being given at the top and the numbers in the side column being taken for seconds.

M.	Horary motion.														M.
	105″	106″	107″	108″	109″	110″	111″	112″	113″	114″	115″	116″	117″	118″	
1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2
3	5	5	5	5	5	6	6	6	6	6	6	6	6	6	3
4	7	7	7	7	7	7	7	7	8	8	8	8	8	8	4
5	9	9	9	9	9	9	9	9	9	10	10	10	10	10	5
6	11	11	11	11	11	11	11	11	11	11	12	12	12	12	6
7	12	12	12	13	13	13	13	13	13	13	13	14	14	14	7
8	14	14	14	14	15	15	15	15	15	15	15	15	16	16	8
9	16	16	16	16	16	17	17	17	17	17	17	17	18	18	9
10	18	18	18	18	18	18	19	19	19	19	19	19	20	20	10
11	19	19	20	20	20	20	20	21	21	21	21	21	21	22	11
12	21	21	21	22	22	22	22	22	23	23	23	23	23	24	12
13	23	23	23	23	24	24	24	24	24	25	25	25	25	26	13
14	25	25	25	25	25	26	26	26	26	27	27	27	27	28	14
15	26	27	27	27	27	28	28	28	28	29	29	29	29	30	15
16	28	28	29	29	29	29	30	30	30	30	31	31	31	31	16
17	30	30	30	31	31	31	31	32	32	32	33	33	33	33	17
18	32	32	32	32	33	33	33	34	34	34	35	35	35	35	18
19	33	34	34	34	35	35	35	35	36	36	36	37	37	37	19
20	35	35	36	36	36	37	37	37	38	38	38	39	39	39	20
21	37	37	37	38	38	39	39	39	40	40	40	41	41	41	21
22	39	39	39	40	40	40	41	41	41	42	42	43	43	43	22
23	40	41	41	41	42	42	43	43	43	44	44	44	45	45	23
24	42	42	43	43	44	44	44	45	45	46	46	46	47	47	24
25	44	44	45	45	45	46	46	47	47	48	48	48	49	49	25
26	46	46	46	47	47	48	48	49	49	49	50	50	51	51	26
27	47	48	48	49	49	50	50	50	51	51	52	52	53	53	27
28	49	49	50	50	51	51	52	52	53	53	54	54	55	55	28
29	51	51	52	52	53	53	54	54	55	55	56	56	57	57	29
30	53	53	54	54	55	55	56	56	57	57	58	58	59	59	30
31	54	55	55	56	56	57	57	58	58	59	59	60	60	61	31
32	56	57	57	58	58	59	59	60	60	61	61	62	62	63	32
33	58	58	59	59	60	61	61	62	62	63	63	64	64	65	33
34	60	60	61	61	62	62	63	63	64	65	65	66	66	67	34
35	61	62	62	63	64	64	65	65	66	67	67	68	68	69	35
36	63	64	64	65	65	66	67	67	68	68	69	70	70	71	36
37	65	65	66	67	67	68	68	69	70	70	71	72	72	73	37
38	67	67	68	68	69	70	70	71	72	72	73	73	74	75	38
39	68	69	70	70	71	72	72	73	73	74	75	75	76	77	39
40	70	71	71	72	73	73	74	75	75	76	77	77	78	79	40
41	72	72	73	74	74	75	76	77	77	78	79	79	80	81	41
42	74	74	75	76	76	77	78	78	79	80	81	81	82	83	42
43	75	76	77	77	78	79	80	80	81	82	82	83	84	85	43
44	77	78	78	79	80	81	81	82	83	84	84	85	86	87	44
45	79	80	80	81	82	83	83	84	85	86	86	87	88	89	45
46	81	81	82	83	84	84	85	86	87	87	88	89	90	90	46
47	82	83	84	85	85	86	87	88	89	89	90	91	92	92	47
48	84	85	86	86	87	88	89	90	90	91	92	93	94	94	48
49	86	87	87	88	89	90	91	91	92	93	94	95	96	96	49
50	88	88	89	90	91	92	93	93	94	95	96	97	98	98	50
51	89	90	91	92	93	94	94	95	96	97	98	99	99	100	51
52	91	92	93	94	94	95	96	97	98	99	100	101	101	102	52
53	93	94	95	95	96	97	98	99	100	101	102	102	103	104	53
54	95	95	96	97	98	99	100	101	102	103	104	104	105	106	54
55	96	97	98	99	100	101	102	103	104	105	105	106	107	108	55
56	98	99	100	101	102	103	104	105	105	106	107	108	109	110	56
57	100	101	102	103	104	105	105	106	107	108	109	110	111	112	57
58	102	102	103	104	105	106	107	108	109	110	111	112	113	114	58
59	103	104	105	106	107	108	109	110	111	112	113	114	115	116	59
60	105	106	107	108	109	110	111	112	113	114	115	116	117	118	60

TABLE 12.

For finding the Variation of the Sun's Right Ascension or Declination, or of the Equation of Time, in any number of minutes of time, the Horary Motion being given at the top of the page in seconds, and the number of minutes of time in the side column. Also for finding the Variation of the Moon's Declination or Right Ascension in seconds of time, the motion in one minute being given at the top, and the numbers in the side column being taken for seconds.

M.	Horary motion.														M.
	119″	120″	121″	122″	123″	124″	125″	126″	127″	128″	129″	130″	131″	132″	
1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2
3	6	6	6	6	6	6	6	6	6	6	6	7	7	7	3
4	8	8	8	8	8	8	8	8	8	9	9	9	9	9	4
5	10	10	10	10	10	10	10	11	11	11	11	11	11	11	5
6	12	12	12	12	12	12	13	13	13	13	13	13	13	13	6
7	14	14	14	14	14	14	15	15	15	15	15	15	15	15	7
8	16	16	16	16	16	17	17	17	17	17	17	17	17	18	8
9	18	18	18	18	18	19	19	19	19	19	19	20	20	20	9
10	20	20	20	20	21	21	21	21	21	21	22	22	22	22	10
11	22	22	22	22	23	23	23	23	23	23	24	24	24	24	11
12	24	24	24	24	25	25	25	25	25	26	26	26	26	26	12
13	26	26	26	26	27	27	27	27	28	28	28	28	28	29	13
14	28	28	28	28	29	29	29	29	30	30	30	30	31	31	14
15	30	30	30	31	31	31	31	32	32	32	32	33	33	33	15
16	32	32	32	33	33	33	33	34	34	34	34	35	35	35	16
17	34	34	34	35	35	35	35	36	36	36	37	37	37	37	17
18	36	36	36	37	37	37	38	38	38	38	39	39	39	40	18
19	38	38	38	39	39	39	40	40	40	41	41	41	41	42	19
20	40	40	40	41	41	41	42	42	42	43	43	43	44	44	20
21	42	42	42	43	43	43	44	44	44	45	45	46	46	46	21
22	44	44	44	45	45	45	46	46	47	47	47	48	48	48	22
23	46	46	46	47	47	48	48	48	49	49	49	50	50	51	23
24	48	48	48	49	49	50	50	50	51	51	52	52	52	53	24
25	50	50	50	51	51	52	52	53	53	53	54	54	55	55	25
26	52	52	52	53	53	54	54	55	55	55	56	56	57	57	26
27	54	54	54	55	55	56	56	57	57	58	58	59	59	59	27
28	56	56	56	57	57	58	58	59	59	60	60	61	61	62	28
29	58	58	58	59	59	60	60	61	61	62	62	63	63	64	29
30	60	60	61	61	62	62	63	63	64	64	65	65	66	66	30
31	61	62	63	63	64	64	65	65	66	66	67	67	68	68	31
32	63	64	65	65	66	66	67	67	68	68	69	69	70	70	32
33	65	66	67	67	68	68	69	69	70	70	71	72	72	73	33
34	67	68	69	69	70	70	71	71	72	73	73	74	74	75	34
35	69	70	71	71	72	72	73	74	74	75	75	76	76	77	35
36	71	72	73	73	74	74	75	76	76	77	77	78	79	79	36
37	73	74	75	75	76	76	77	78	78	79	80	80	81	81	37
38	75	76	77	77	78	79	79	80	80	81	82	82	83	84	38
39	77	78	79	79	80	81	81	82	83	83	84	85	85	86	39
40	79	80	81	81	82	83	83	84	85	85	86	87	87	88	40
41	81	82	83	83	84	85	85	86	87	87	88	89	90	90	41
42	83	84	85	85	86	87	88	88	89	90	90	91	92	92	42
43	85	86	87	87	88	89	90	90	91	92	92	93	94	95	43
44	87	88	89	89	90	91	92	92	93	94	95	95	96	97	44
45	89	90	91	92	92	93	94	95	95	96	97	98	98	99	45
46	91	92	93	94	94	95	96	97	97	98	99	100	100	101	46
47	93	94	95	96	96	97	98	99	99	100	101	102	103	103	47
48	95	96	97	98	98	99	100	101	102	102	103	104	105	106	48
49	97	98	99	100	100	101	102	103	104	105	105	106	107	108	49
50	99	100	101	102	103	103	104	105	106	107	108	108	109	110	50
51	101	102	103	104	105	105	106	107	108	109	110	111	111	112	51
52	103	104	105	106	107	107	108	109	110	111	112	113	114	114	52
53	105	106	107	108	109	110	110	111	112	113	114	115	116	117	53
54	107	108	109	110	111	112	113	113	114	115	116	117	118	119	54
55	109	110	111	112	113	114	115	116	116	117	118	119	120	121	55
56	111	112	113	114	115	116	117	118	119	119	120	121	122	123	56
57	113	114	115	116	117	118	119	120	121	122	123	124	124	125	57
58	115	116	117	118	119	120	121	122	123	124	125	126	127	128	58
59	117	118	119	120	121	122	123	124	125	126	127	128	129	130	59
60	119	120	121	122	123	124	125	126	127	128	129	130	131	132	60

TABLE 12.

For finding the Variation of the Sun's Right Ascension or Declination, or of the Equation of Time, in any number of minutes of time, the Horary Motion being given at the top of the page in seconds, and the number of minutes of time in the side column. Also for finding the Variation of the Moon's Declination or Right Ascension in seconds of time, the motion in one minute being given at the top, and the numbers in the side column being taken for seconds.

M.	Horary motion.														M.
	133″	134″	135″	136″	137″	138″	139″	140″	141″	142″	143″	144″	145″	146″	
1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
2	4	4	5	5	5	5	5	5	5	5	5	5	5	5	2
3	7	7	7	7	7	7	7	7	7	7	7	7	7	7	3
4	9	9	9	9	9	9	9	9	9	9	10	10	10	10	4
5	11	11	11	11	11	12	12	12	12	12	12	12	12	12	5
6	13	13	14	14	14	14	14	14	14	14	14	14	15	15	6
7	16	16	16	16	16	16	16	16	16	17	17	17	17	17	7
8	18	18	18	18	18	18	19	19	19	19	19	19	19	19	8
9	20	20	20	20	21	21	21	21	21	21	21	22	22	22	9
10	22	22	23	23	23	23	23	23	24	24	24	24	24	24	10
11	24	25	25	25	25	25	25	26	26	26	26	26	27	27	11
12	27	27	27	27	27	28	28	28	28	28	29	29	29	29	12
13	29	29	29	29	30	30	30	30	31	31	31	31	31	32	13
14	31	31	32	32	32	32	32	33	33	33	33	34	34	34	14
15	33	34	34	34	34	35	35	35	35	36	36	36	36	37	15
16	35	36	36	36	37	37	37	37	38	38	38	38	39	39	16
17	38	38	38	39	39	39	39	40	40	40	41	41	41	41	17
18	40	40	41	41	41	41	42	42	42	43	43	43	44	44	18
19	42	42	43	43	43	44	44	44	45	45	45	46	46	46	19
20	44	45	45	45	46	46	46	47	47	47	48	48	48	49	20
21	47	47	47	48	48	48	49	49	49	50	50	50	51	51	21
22	49	49	50	50	50	51	51	51	52	52	52	53	53	54	22
23	51	51	52	52	53	53	53	54	54	54	55	55	56	56	23
24	53	54	54	54	55	55	56	56	56	57	57	58	58	58	24
25	55	56	56	57	57	58	58	58	59	59	60	60	60	61	25
26	58	58	59	59	59	60	60	61	61	62	62	62	63	63	26
27	60	60	61	61	62	62	63	63	63	64	64	65	65	66	27
28	62	63	63	63	64	64	65	65	66	66	67	67	68	68	28
29	64	65	65	66	66	67	67	68	68	69	69	70	70	71	29
30	67	67	68	68	69	69	70	70	71	71	72	72	73	73	30
31	69	69	70	70	71	71	72	72	73	73	74	74	75	75	31
32	71	71	72	73	73	74	74	75	75	76	76	77	77	78	32
33	73	74	74	75	75	76	76	77	78	78	79	79	80	80	33
34	75	76	77	77	78	78	79	79	80	80	81	82	82	83	34
35	78	78	79	79	80	81	81	82	82	83	83	84	85	85	35
36	80	80	81	82	82	83	83	84	85	85	86	86	87	88	36
37	82	83	83	84	84	85	86	86	87	88	88	89	89	90	37
38	84	85	86	86	87	87	88	89	89	90	91	91	92	92	38
39	86	87	88	88	89	90	90	91	92	92	93	94	94	95	39
40	89	89	90	91	91	92	93	93	94	95	95	96	97	97	40
41	91	92	92	93	94	94	95	96	96	97	98	98	99	100	41
42	93	94	95	95	96	97	97	98	99	99	100	101	102	102	42
43	95	96	97	97	98	99	100	100	101	102	102	103	104	105	43
44	98	98	99	100	100	101	102	103	103	104	105	106	106	107	44
45	100	101	101	102	103	104	104	105	106	107	107	108	109	110	45
46	102	103	104	104	105	106	107	107	108	109	110	110	111	112	46
47	104	105	106	107	107	108	109	110	110	111	112	113	114	114	47
48	106	107	108	109	110	110	111	112	113	114	114	115	116	117	48
49	109	109	110	111	112	113	114	114	115	116	117	118	118	119	49
50	111	112	113	113	114	115	116	117	118	118	119	120	121	122	50
51	113	114	115	116	116	117	118	119	120	121	122	122	123	124	51
52	115	116	117	118	119	120	120	121	122	123	124	125	126	127	52
53	117	118	119	120	121	122	123	124	125	125	126	127	128	129	53
54	120	121	122	122	123	124	125	126	127	128	129	130	131	131	54
55	122	123	124	125	126	127	127	128	129	130	131	132	133	134	55
56	124	125	126	127	128	129	130	131	132	133	133	134	135	136	56
57	126	127	128	129	130	131	132	133	134	135	136	137	138	139	57
58	129	130	131	131	132	133	134	135	136	137	138	139	140	141	58
59	131	132	133	134	135	136	137	138	139	140	141	142	143	144	59
60	133	134	135	136	137	138	139	140	141	142	143	144	145	146	60

TABLE 12.

For finding the Variation of the Sun's Right Ascension, or Declination, or of the Equation of Time in any number of minutes of time, the Horary Motion being given at the top of the page in seconds, and the number of minutes of time in the side column. Also for finding the Variation of the Moon's Declination or Right Ascension in seconds of time, the motion in one minute being given at the top, and the numbers in the side column being taken for seconds.

M.	Horary motion.														M.
	147″	148″	149″	150″	151″	152″	153″	154″	155″	156″	157″	158″	159″	160″	
1	2	2	2	3	3	3	3	3	3	3	3	3	3	3	1
2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2
3	7	7	7	8	8	8	8	8	8	8	8	8	8	8	3
4	10	10	10	10	10	10	10	10	10	10	10	11	11	11	4
5	12	12	12	13	13	13	13	13	13	13	13	13	13	13	5
6	15	15	15	15	15	15	15	15	16	16	16	16	16	16	6
7	17	17	17	18	18	18	18	18	18	18	18	18	19	19	7
8	20	20	20	20	20	20	20	21	21	21	21	21	21	21	8
9	22	22	22	23	23	23	23	23	23	23	24	24	24	24	9
10	25	25	25	25	25	25	26	26	26	26	26	26	27	27	10
11	27	27	27	28	28	28	28	28	28	29	29	29	29	29	11
12	29	30	30	30	30	30	31	31	31	31	31	32	32	32	12
13	32	32	32	33	33	33	33	33	34	34	34	34	34	35	13
14	34	35	35	35	35	35	36	36	36	36	37	37	37	37	14
15	37	37	37	38	38	38	38	39	39	39	39	40	40	40	15
16	39	39	40	40	40	41	41	41	41	42	42	42	42	43	16
17	42	42	42	43	43	43	43	44	44	44	44	45	45	45	17
18	44	44	45	45	45	46	46	46	47	47	47	47	48	48	18
19	47	47	47	48	48	48	48	49	49	49	50	50	50	51	19
20	49	49	50	50	50	51	51	51	52	52	52	53	53	53	20
21	51	52	52	53	53	53	54	54	54	55	55	55	56	56	21
22	54	54	55	55	55	56	56	56	57	57	58	58	58	59	22
23	56	57	57	58	58	58	59	59	59	60	60	61	61	61	23
24	59	59	60	60	60	61	61	62	62	62	63	63	64	64	24
25	61	62	62	63	63	63	64	64	65	65	65	66	66	67	25
26	64	64	65	65	65	66	66	67	67	68	68	68	69	69	26
27	66	67	67	68	68	68	69	69	70	70	71	71	72	72	27
28	69	69	70	70	70	71	71	72	72	73	73	74	74	75	28
29	71	72	72	73	73	73	74	74	75	75	76	76	77	77	29
30	74	74	75	75	76	76	77	77	78	78	79	79	80	80	30
31	76	76	77	78	78	79	79	80	80	81	81	82	82	83	31
32	78	79	79	80	81	81	82	82	83	83	84	84	85	85	32
33	81	81	82	83	83	84	84	85	85	86	86	87	87	88	33
34	83	84	84	85	86	86	87	87	88	88	89	90	90	91	34
35	86	86	87	88	88	89	89	90	90	91	92	92	93	93	35
36	88	89	89	90	91	91	92	92	93	94	94	95	95	96	36
37	91	91	92	93	93	94	94	95	96	96	97	97	98	99	37
38	93	94	94	95	96	96	97	98	98	99	99	100	101	101	38
39	96	96	97	98	98	99	99	100	101	101	102	103	103	104	39
40	98	99	99	100	101	101	102	103	103	104	105	105	106	107	40
41	100	101	102	103	103	104	105	105	106	107	107	108	109	109	41
42	103	104	104	105	106	106	107	108	109	109	110	111	111	112	42
43	105	106	107	108	108	109	110	110	111	112	113	113	114	115	43
44	108	109	109	110	111	111	112	113	114	114	115	116	117	117	44
45	110	111	112	113	113	114	115	116	116	117	118	119	119	120	45
46	113	113	114	115	116	117	117	118	119	120	120	121	122	123	46
47	115	116	117	118	118	119	120	121	121	122	123	124	125	125	47
48	118	118	119	120	121	122	122	123	124	125	126	126	127	128	48
49	120	121	122	123	123	124	125	126	127	127	128	129	130	131	49
50	123	123	124	125	126	127	128	128	129	130	131	132	133	133	50
51	125	126	127	128	128	129	130	131	132	133	133	134	135	136	51
52	127	128	129	130	131	132	133	133	134	135	136	137	138	139	52
53	130	131	132	133	133	134	135	136	137	138	139	140	140	141	53
54	132	133	134	135	136	137	138	139	140	140	141	142	143	144	54
55	135	136	137	138	138	139	140	141	142	143	144	145	146	147	55
56	137	138	139	140	141	142	143	144	145	146	147	147	148	149	56
57	140	141	142	143	143	144	145	146	147	148	149	150	151	152	57
58	142	143	144	145	146	147	148	149	150	151	152	153	154	155	58
59	145	146	147	148	148	149	150	151	152	153	154	155	156	157	59
60	147	148	149	150	151	152	153	154	155	156	157	158	159	160	60

TABLE 13.

For finding the Sun's change of Right Ascension for any given number of hours.

Hourly variation.	Number of hours.												Hourly variation.
	1	2	3	4	5	6	7	8	9	10	11	12	
s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.
8.50	8.5	17.0	25.5	34.0	42.5	51.0	59.5	68.0	76.5	85.0	93.5	102.0	8.50
8.55	8.6	17.1	25.7	34.2	42.8	51.3	59.9	68.4	77.0	85.5	94.1	102.6	8.55
8.60	8.6	17.2	25.8	34.4	43.0	51.6	60.2	68.8	77.4	86.0	94.6	103.2	8.60
8.65	8.7	17.3	26.0	34.6	43.3	51.9	60.6	69.2	77.9	86.5	95.2	103.8	8.65
8.70	8.7	17.4	26.1	34.8	43.5	52.2	60.9	69.6	78.3	87.0	95.7	104.4	8.70
8.75	8.8	17.5	26.3	35.0	43.8	52.5	61.3	70.0	78.8	87.5	96.3	105.0	8.75
8.80	8.8	17.6	26.4	35.2	44.0	52.8	61.6	70.4	79.2	88.0	96.8	105.6	8.80
8.85	8.9	17.7	26.6	35.4	44.3	53.1	62.0	70.8	79.7	88.5	97.4	106.2	8.85
8.90	8.9	17.8	26.7	35.6	44.5	53.4	62.3	71.2	80.1	89.0	97.9	106.8	8.90
8.95	9.0	17.9	26.9	35.8	44.8	53.7	62.7	71.6	80.6	89.5	98.5	107.4	8.95
9.00	9.0	18.0	27.0	36.0	45.0	54.0	63.0	72.0	81.0	90.0	99.0	108.0	9.00
9.05	9.1	18.1	27.2	36.2	45.3	54.3	63.4	72.4	81.5	90.5	99.6	108.6	9.05
9.10	9.1	18.2	27.3	36.4	45.5	54.6	63.7	72.8	81.9	91.0	100.1	109.2	9.10
9.15	9.2	18.3	27.5	36.6	45.8	54.9	64.1	73.2	82.4	91.5	100.7	109.8	9.15
9.20	9.2	18.4	27.6	36.8	46.0	55.2	64.4	73.6	82.8	92.0	101.2	110.4	9.20
9.25	9.3	18.5	27.8	37.0	46.3	55.5	64.8	74.0	83.3	92.5	101.8	111.0	9.25
9.30	9.3	18.6	27.9	37.2	46.5	55.8	65.1	74.4	83.7	93.0	102.3	111.6	9.30
9.35	9.4	18.7	28.1	37.4	46.8	56.1	65.5	74.8	84.2	93.5	102.9	112.2	9.35
9.40	9.4	18.8	28.2	37.6	47.0	56.4	65.8	75.2	84.6	94.0	103.4	112.8	9.40
9.45	9.5	18.9	28.4	37.8	47.3	56.7	66.2	75.6	85.1	94.5	104.0	113.4	9.45
9.50	9.5	19.0	28.5	38.0	47.5	57.0	66.5	76.0	85.5	95.0	104.5	114.0	9.50
9.55	9.6	19.1	28.7	38.2	47.8	57.3	66.9	76.4	86.0	95.5	105.1	114.6	9.55
9.60	9.6	19.2	28.8	38.4	48.0	57.6	67.2	76.8	86.4	96.0	105.6	115.2	9.60
9.65	9.7	19.3	29.0	38.6	48.3	57.9	67.6	77.2	86.9	96.5	106.2	115.8	9.65
9.70	9.7	19.4	29.1	38.8	48.5	58.2	67.9	77.6	87.3	97.0	106.7	116.4	9.70
9.75	9.8	19.5	29.3	39.0	48.8	58.5	68.3	78.0	87.8	97.5	107.3	117.0	9.75
9.80	9.8	19.6	29.4	39.2	49.0	58.8	68.6	78.4	88.2	98.0	107.8	117.6	9.80
9.85	9.9	19.7	29.6	39.4	49.3	59.1	69.0	78.8	88.7	98.5	108.4	118.2	9.85
9.90	9.9	19.8	29.7	39.6	49.5	59.4	69.3	79.2	89.1	99.0	108.9	118.8	9.90
9.95	10.0	19.9	29.9	39.8	49.8	59.7	69.7	79.6	89.6	99.5	109.5	119.4	9.95
10.00	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	10.00
10.05	10.1	20.1	30.2	40.2	50.3	60.3	70.4	80.4	90.5	100.5	110.6	120.6	10.05
10.10	10.1	20.2	30.3	40.4	50.5	60.6	70.7	80.8	90.9	101.0	111.1	121.2	10.10
10.15	10.2	20.3	30.5	40.6	50.8	60.9	71.1	81.2	91.4	101.5	111.7	121.8	10.15
10.20	10.2	20.4	30.6	40.8	51.0	61.2	71.4	81.6	91.8	102.0	112.2	122.4	10.20
10.25	10.3	20.5	30.8	41.0	51.3	61.5	71.8	82.0	92.3	102.5	112.8	123.0	10.25
10.30	10.3	20.6	30.9	41.2	51.5	61.8	72.1	82.4	92.7	103.0	113.3	123.6	10.30
10.35	10.4	20.7	31.1	41.4	51.8	62.1	72.5	82.8	93.2	103.5	113.9	124.2	10.35
10.40	10.4	20.8	31.2	41.6	52.0	62.4	72.8	83.2	93.6	104.0	114.4	124.8	10.40
10.45	10.5	20.9	31.4	41.8	52.3	62.7	73.2	83.6	94.1	104.5	115.0	125.4	10.45
10.50	10.5	21.0	31.5	42.0	52.5	63.0	73.5	84.0	94.5	105.0	115.5	126.0	10.50
10.55	10.6	21.1	31.7	42.2	52.8	63.3	73.9	84.4	95.0	105.5	116.1	126.6	10.55
10.60	10.6	21.2	31.8	42.4	53.0	63.6	74.2	84.8	95.4	106.0	116.6	127.2	10.60
10.65	10.7	21.3	32.0	42.6	53.3	63.9	74.6	85.2	95.9	106.5	117.2	127.8	10.65
10.70	10.7	21.4	32.1	42.8	53.5	64.2	74.9	85.6	96.3	107.0	117.7	128.4	10.70
10.75	10.8	21.5	32.3	43.0	53.8	64.5	75.3	86.0	96.8	107.5	118.3	129.0	10.75
10.80	10.8	21.6	32.4	43.2	54.0	64.8	75.6	86.4	97.2	108.0	118.8	129.6	10.80
10.85	10.9	21.7	32.6	43.4	54.3	65.1	76.0	86.8	97.7	108.5	119.4	130.2	10.85
10.90	10.9	21.8	32.7	43.6	54.5	65.4	76.3	87.2	98.1	109.0	119.9	130.8	10.90
10.95	11.0	21.9	32.9	43.8	54.8	65.7	76.7	87.6	98.6	109.5	120.5	131.4	10.95
11.00	11.0	22.0	33.0	44.0	55.0	66.0	77.0	88.0	99.0	110.0	121.0	132.0	11.00
11.05	11.1	22.1	33.2	44.2	55.3	66.3	77.4	88.4	99.5	110.5	121.6	132.6	11.05
11.10	11.1	22.2	33.3	44.4	55.5	66.6	77.7	88.8	99.9	111.0	122.1	133.2	11.10
11.15	11.2	22.3	33.5	44.6	55.8	66.9	78.1	89.2	100.4	111.5	122.7	133.8	11.15
11.20	11.2	22.4	33.6	44.8	56.0	67.2	78.4	89.6	100.8	112.0	123.2	134.4	11.20
11.25	11.3	22.5	33.8	45.0	56.3	67.5	78.8	90.0	101.3	112.5	123.8	135.0	11.25
11.30	11.3	22.6	33.9	45.2	56.5	67.8	79.1	90.4	101.7	113.0	124.3	135.6	11.30
11.35	11.4	22.7	34.1	45.4	56.8	68.1	79.5	90.8	102.2	113.5	124.9	136.2	11.35
11.40	11.4	22.8	34.2	45.6	57.0	68.4	79.8	91.2	102.6	114.0	125.4	136.8	11.40
11.45	11.5	22.9	34.4	45.8	57.3	68.7	80.2	91.6	103.1	114.5	126.0	137.4	11.45

TABLE 13.

For finding the Sun's change of Right Ascension for any given number of hours.

Hourly variation.	Number of hours.												Hourly variation.
	13	14	15	16	17	18	19	20	21	22	23	24	
s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.
8.50	110.5	119.0	127.5	136.0	144.5	153.0	161.5	170.0	178.5	187.0	195.5	204.0	8.50
8.55	111.2	119.7	128.3	136.8	145.4	153.9	162.5	171.0	179.6	188.1	196.7	205.2	8.55
8.60	111.8	120.4	129.0	137.6	146.2	154.8	163.4	172.0	180.6	189.2	197.8	206.4	8.60
8.65	112.5	121.1	129.8	138.4	147.1	155.7	164.4	173.0	181.7	190.3	199.0	207.6	8.65
8.70	113.1	121.8	130.5	139.2	147.9	156.6	165.3	174.0	182.7	191.4	200.1	208.8	8.70
8.75	113.8	122.5	131.3	140.0	148.8	157.5	166.3	175.0	183.8	192.5	201.3	210.0	8.75
8.80	114.4	123.2	132.0	140.8	149.6	158.4	167.2	176.0	184.8	193.6	202.4	211.2	8.80
8.85	115.1	123.9	132.8	141.6	150.5	159.3	168.2	177.0	185.9	194.7	203.6	212.4	8.85
8.90	115.7	124.6	133.5	142.4	151.3	160.2	169.1	178.0	186.9	195.8	204.7	213.6	8.90
8.95	116.4	125.3	134.3	143.2	152.2	161.1	170.1	179.0	188.0	196.9	205.9	214.8	8.95
9.00	117.0	126.0	135.0	144.0	153.0	162.0	171.0	180.0	189.0	198.0	207.0	216.0	9.00
9.05	117.7	126.7	135.8	144.8	153.9	162.9	172.0	181.0	190.1	199.1	208.2	217.2	9.05
9.10	118.3	127.4	136.5	145.6	154.7	163.8	172.9	182.0	191.1	200.2	209.3	218.4	9.10
9.15	119.0	128.1	137.3	146.4	155.6	164.7	173.9	183.0	192.2	201.3	210.5	219.6	9.15
9.20	119.6	128.8	138.0	147.2	156.4	165.6	174.8	184.0	193.2	202.4	211.6	220.8	9.20
9.25	120.3	129.5	138.8	148.0	157.3	166.5	175.8	185.0	194.3	203.5	212.8	222.0	9.25
9.30	120.9	130.2	139.5	148.8	158.1	167.4	176.7	186.0	195.3	204.6	213.9	223.2	9.30
9.35	121.6	130.9	140.3	149.6	159.0	168.3	177.7	187.0	196.4	205.7	215.1	224.4	9.35
9.40	122.2	131.6	141.0	150.4	159.8	169.2	178.6	188.0	197.4	206.8	216.2	225.6	9.40
9.45	122.9	132.3	141.8	151.2	160.7	170.1	179.6	189.0	198.5	207.9	217.4	226.8	9.45
9.50	123.5	133.0	142.5	152.0	161.5	171.0	180.5	190.0	199.5	209.0	218.5	228.0	9.50
9.55	124.2	133.7	143.3	152.8	162.4	171.9	181.5	191.0	200.6	210.1	219.7	229.2	9.55
9.60	124.8	134.4	144.0	153.6	163.2	172.8	182.4	192.0	201.6	211.2	220.8	230.4	9.60
9.65	125.5	135.1	144.8	154.4	164.1	173.7	183.4	193.0	202.7	212.3	222.0	231.6	9.65
9.70	126.1	135.8	145.5	155.2	164.9	174.6	184.3	194.0	203.7	213.4	223.1	232.8	9.70
9.75	126.8	136.5	146.3	156.0	165.8	175.5	185.3	195.0	204.8	214.5	224.3	234.0	9.75
9.80	127.4	137.2	147.0	156.8	166.6	176.4	186.2	196.0	205.8	215.6	225.4	235.2	9.80
9.85	128.1	137.9	147.8	157.6	167.5	177.3	187.2	197.0	206.9	216.7	226.6	236.4	9.85
9.90	128.7	138.6	148.5	158.4	168.3	178.2	188.1	198.0	207.9	217.8	227.7	237.6	9.90
9.95	129.4	139.3	149.3	159.2	169.2	179.1	189.1	199.0	209.0	218.9	228.9	238.8	9.95
10.00	130.0	140.0	150.0	160.0	170.0	180.0	190.0	200.0	210.0	220.0	230.0	240.0	10.00
10.05	130.7	140.7	150.8	160.8	170.9	180.9	191.0	201.0	211.1	221.1	231.2	241.2	10.05
10.10	131.3	141.4	151.5	161.6	171.7	181.8	191.9	202.0	212.1	222.2	232.3	242.4	10.10
10.15	132.0	142.1	152.3	162.4	172.6	182.7	192.9	203.0	213.2	223.3	233.5	243.6	10.15
10.20	132.6	142.8	153.0	163.2	173.4	183.6	193.8	204.0	214.2	224.4	234.6	244.8	10.20
10.25	133.3	143.5	153.8	164.0	174.3	184.5	194.8	205.0	215.3	225.5	235.8	246.0	10.25
10.30	133.9	144.2	154.5	164.8	175.1	185.4	195.7	206.0	216.3	226.6	236.9	247.2	10.30
10.35	134.6	144.9	155.3	165.6	176.0	186.3	196.7	207.0	217.4	227.7	238.1	248.4	10.35
10.40	135.2	145.6	156.0	166.4	176.8	187.2	197.6	208.0	218.4	228.8	239.2	249.6	10.40
10.45	135.9	146.3	156.8	167.2	177.7	188.1	198.6	209.0	219.5	229.9	240.4	250.8	10.45
10.50	136.5	147.0	157.5	168.0	178.5	189.0	199.5	210.0	220.5	231.0	241.5	252.0	10.50
10.55	137.2	147.7	158.3	168.8	179.4	189.9	200.5	211.0	221.6	232.1	242.7	253.2	10.55
10.60	137.8	148.4	159.0	169.6	180.2	190.8	201.4	212.0	222.6	233.2	243.8	254.4	10.60
10.65	138.5	149.1	159.8	170.4	181.1	191.7	202.4	213.0	223.7	234.3	245.0	255.6	10.65
10.70	139.1	149.8	160.5	171.2	181.9	192.6	203.3	214.0	224.7	235.4	246.1	256.8	10.70
10.75	139.8	150.5	161.3	172.0	182.8	193.5	204.3	215.0	225.8	236.5	247.3	258.0	10.75
10.80	140.4	151.2	162.0	172.8	183.6	194.4	205.2	216.0	226.8	237.6	248.4	259.2	10.80
10.85	141.1	151.9	162.8	173.6	184.5	195.3	206.2	217.0	227.9	238.7	249.6	260.4	10.85
10.90	141.7	152.6	163.5	174.4	185.3	196.2	207.1	218.0	228.9	239.8	250.7	261.6	10.90
10.95	142.4	153.3	164.3	175.2	186.2	197.1	208.1	219.0	230.0	240.9	251.9	262.8	10.95
11.00	143.0	154.0	165.0	176.0	187.0	198.0	209.0	220.0	231.0	242.0	253.0	264.0	11.00
11.05	143.7	154.7	165.8	176.8	187.9	198.9	210.0	221.0	232.1	243.1	254.2	265.2	11.05
11.10	144.3	155.4	166.5	177.6	188.7	199.8	210.9	222.0	233.1	244.2	255.3	266.4	11.10
11.15	145.0	156.1	167.3	178.4	189.6	200.7	211.9	223.0	234.2	245.3	256.5	267.6	11.15
11.20	145.6	156.8	168.0	179.2	190.4	201.6	212.8	224.0	235.2	246.4	257.6	268.8	11.20
11.25	146.3	157.5	168.8	180.0	191.3	202.5	213.8	225.0	236.3	247.5	258.8	270.0	11.25
11.30	146.9	158.2	169.5	180.8	192.1	203.4	214.7	226.0	237.3	248.6	259.9	271.2	11.30
11.35	147.6	158.9	170.3	181.6	193.0	204.3	215.7	227.0	238.4	249.7	261.1	272.4	11.35
11.40	148.2	159.6	171.0	182.4	193.8	205.2	216.6	228.0	239.4	250.8	262.2	273.6	11.40
11.45	148.9	160.3	171.8	183.2	194.7	206.1	217.6	229.0	240.5	251.9	263.4	274.8	11.45

TABLE 14.

Dip of the Sea Horizon.

Height of the Eye.	Dip of the Horizon.
Feet.	′ ″
1	0 59
2	1 23
3	1 42
4	1 58
5	2 11
6	2 24
7	2 36
8	2 46
9	2 56
10	3 06
11	3 15
12	3 24
13	3 32
14	3 40
15	3 48
16	3 55
17	4 02
18	4 09
19	4 16
20	4 23
21	4 29
22	4 36
23	4 42
24	4 48
25	4 54
26	5 00
27	5 06
28	5 11
29	5 17
30	5 22
31	5 27
32	5 33
33	5 38
34	5 43
35	5 48
36	5 53
37	5 58
38	6 02
39	6 07
40	6 12
45	6 36
50	6 56
55	7 16
60	7 35
65	7 54
70	8 12
75	8 29
80	8 46
85	9 02
90	9 18
95	9 33
100	9 48

TABLE 15.

Dip of the Sea at different Distances from the Observer.

Dist. of Land in Sea Miles.	Height of the Eye above the Sea in Feet.							
	5	10	15	20	25	30	35	40
	′	′	′	′	′	′	′	′
¼	11	23	34	45	57	68	79	91
½	6	12	17	23	28	34	40	45
¾	4	8	12	15	19	23	27	30
1	3	6	9	12	15	17	20	23
1¼	3	5	7	10	12	14	16	19
1½	3	4	6	8	10	12	14	16
2	2	4	5	7	8	9	11	12
2½	2	3	4	6	7	8	9	10
3	2	3	4	5	6	7	8	9
3½	2	3	4	5	6	6	7	8
4	2	3	4	5	5	6	7	7
5	2	3	4	4	5	6	6	7
6	2	3	4	4	5	5	6	6

Note to Table 15.—The numbers of this Table below the black lines are the same as are given in Table 14, the visible horizon corresponding to those heights not being so far distant as the land.

TABLE 16.

The Sun's Parallax in Altitude.

Altitude.	Parallax.
°	″
0	9
10	9
20	8
30	8
40	7
50	6
55	5
60	4
65	4
70	3
75	2
80	2
85	1
90	0

TABLE 17.

Parallax in Altitude of a Planet.

Altitude.	Horizontal parallax of planet.																														Altitude.
°	1″	2″	3″	4″	5″	6″	7″	8″	9″	10″	11″	12″	13″	14″	15″	16″	17″	18″	19″	20″	21″	22″	23″	24″	25″	26″	27″	28″	30″	35″	°
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30	35	0
10	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30	35	10
20	1	2	3	4	5	6	7	8	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	23	24	25	26	28	33	20
30	1	2	3	3	4	5	6	7	8	9	10	10	11	12	13	14	15	16	16	17	18	19	20	21	22	23	23	24	26	30	30
35	1	2	2	3	4	5	6	7	7	8	9	10	11	11	12	13	14	15	16	16	17	18	19	20	20	21	22	23	25	29	35
40	1	2	2	3	4	5	5	6	7	8	8	9	10	11	11	12	13	14	15	15	16	17	18	18	19	20	21	21	23	27	40
43	1	1	2	3	4	4	5	6	7	7	8	9	10	10	11	12	12	13	14	15	15	16	17	18	18	19	20	20	22	26	43
46	1	1	2	3	3	4	5	6	6	7	8	8	9	10	10	11	12	13	13	14	15	15	16	17	17	18	19	19	21	24	46
49	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	10	11	12	12	13	14	14	15	16	16	17	18	18	20	23	49
52	1	1	2	2	3	4	4	5	6	6	7	7	8	9	9	10	10	11	12	12	13	14	14	15	15	16	17	17	18	22	52
55	1	1	2	2	3	3	4	5	5	6	6	7	7	8	9	9	10	10	11	11	12	13	13	14	14	15	15	16	17	20	55
58	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	10	10	11	11	12	12	13	13	14	14	15	16	19	58
61	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	15	17	61
64	0	1	1	2	2	3	3	4	4	4	5	5	6	6	7	7	7	8	8	9	9	10	10	11	11	11	12	12	13	15	64
67	0	1	1	2	2	2	3	3	4	4	4	5	5	5	6	6	7	7	7	8	8	9	9	9	10	10	11	11	12	14	67
70	0	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	8	8	8	9	9	9	10	10	12	70
72	0	1	1	1	2	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	6	7	7	7	8	8	8	9	9	11	72
74	0	1	1	1	1	2	2	2	2	3	3	3	4	4	4	4	5	5	5	6	6	6	6	7	7	7	7	8	8	10	74
76	0	0	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	5	6	6	6	6	7	7	7	8	76
78	0	0	1	1	1	1	1	2	2	2	2	2	3	3	3	3	4	4	4	4	4	5	5	5	5	5	6	6	6	7	78
80	0	0	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	5	5	5	5	6	80
82	0	0	0	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	4	4	4	4	5	82
84	0	0	0	0	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	4	84
86	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	86
88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	88
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90

TABLE 18.

Augmentation of the Moon's Semidiameter.

Apparent altitude of ☽.	☽'s Semidiameter.					
	14′	15′		16′		17′
	30″	0″	30″	0″	30″	0″
°	″	″	″	″	″	″
0	0.1	0.1	0.1	0.1	0.2	0.2
2	0.6	0.6	0.7	0.7	0.8	0.8
4	1.0	1.1	1.2	1.3	1.4	1.5
6	1.5	1.6	1.7	1.9	2.0	2.1
8	2.0	2.1	2.3	2.4	2.6	2.7
10	2.4	2.6	2.8	3.0	3.2	3.4
12	2.9	3.1	3.3	3.6	3.8	4.0
14	3.4	3.6	3.9	4.1	4.4	4.7
16	3.8	4.1	4.4	4.7	5.0	5.3
18	4.3	4.6	4.9	5.2	5.6	5.9
20	4.7	5.1	5.4	5.8	6.1	6.5
22	5.2	5.5	5.9	6.3	6.7	7.1
24	5.6	6.0	6.4	6.8	7.3	7.7
26	6.0	6.5	6.9	7.4	7.8	8.3
28	6.5	6.9	7.4	7.9	8.4	8.9
30	6.9	7.3	7.9	8.4	8.9	9.5
32	7.3	7.8	8.3	8.9	9.4	10.0
34	7.7	8.2	8.8	9.4	10.0	10.6
36	8.1	8.6	9.2	9.8	10.5	11.1
38	8.4	9.0	9.7	10.3	10.9	11.6
40	8.8	9.4	10.1	10.7	11.4	12.1
42	9.2	9.8	10.5	11.2	11.9	12.6
44	9.5	10.2	10.9	11.6	12.3	13.1
46	9.8	10.5	11.3	12.0	12.8	13.6
48	10.2	10.9	11.6	12.4	13.2	14.0
50	10.5	11.2	12.0	12.8	13.6	14.4
52	10.8	11.5	12.3	13.1	14.0	14.9
54	11.1	11.8	12.7	13.5	14.4	15.3
56	11.3	12.1	13.0	13.8	14.7	15.6
58	11.6	12.4	13.3	14.1	15.1	16.0
60	11.8	12.7	13.5	14.4	15.4	16.3
62	12.1	12.9	13.8	14.7	15.7	16.6
64	12.3	13.2	14.1	15.0	16.0	16.9
66	12.5	13.4	14.3	15.2	16.2	17.2
68	12.7	13.6	14.5	15.5	16.5	17.5
70	12.9	13.8	14.7	15.7	16.7	17.7
72	13.0	13.9	14.9	15.9	16.9	17.9
74	13.1	14.1	15.0	16.0	17.1	18.1
76	13.3	14.2	15.2	16.2	17.2	18.3
78	13.4	14.3	15.3	16.3	17.4	18.4
80	13.5	14.4	15.4	16.4	17.5	18.6
82	13.5	14.5	15.5	16.5	17.6	18.7
84	13.6	14.6	15.6	16.6	17.6	18.7
86	13.6	14.6	15.6	16.6	17.7	18.8
88	13.7	14.6	15.6	16.7	17.7	18.8
90	13.7	14.6	15.6	16.7	17.7	18.8

TABLE 19.

Augmentation of the Moon's Horizontal Parallax.

Latitude of observation.	☽'s Hor. Parallax.		
	53′	57′	61′
°	″	″	″
0	0.0	0.0	0.0
2	0.0	0.0	0.0
4	0.1	0.1	0.1
6	0.1	0.1	0.1
8	0.2	0.2	0.2
10	0.3	0.3	0.4
12	0.5	0.5	0.5
14	0.6	0.7	0.7
16	0.8	0.9	0.9
18	1.0	1.1	1.1
20	1.2	1.3	1.4
22	1.5	1.6	1.7
24	1.7	1.9	2.0
26	2.0	2.2	2.3
28	2.3	2.5	2.6
30	2.6	2.8	3.0
32	2.9	3.1	3.4
34	3.3	3.5	3.8
36	3.6	3.9	4.1
38	4.0	4.3	4.6
40	4.3	4.6	5.0
42	4.7	5.0	5.4
44	5.0	5.4	5.8
46	5.4	5.8	6.2
48	5.8	6.2	6.6
50	6.1	6.6	7.1
52	6.5	7.0	7.5
54	6.8	7.4	7.9
56	7.2	7.7	8.3
58	7.5	8.1	8.6
60	7.8	8.4	9.0
62	8.1	8.8	9.4
64	8.4	9.1	9.7
66	8.7	9.4	10.0
68	9.0	9.7	10.3
70	9.2	9.9	10.6
72	9.5	10.2	10.9
74	9.7	10.4	11.1
76	9.8	10.6	11.3
78	10.0	10.8	11.5
80	10.1	10.9	11.7
82	10.3	11.0	11.8
84	10.3	11.1	11.9
86	10.4	11.2	12.0
88	10.4	11.2	12.0
90	10.5	11.3	12.0

TABLE 20A.

Mean Refraction.

[Barometer, 30 inches. Fahrenheit's Thermometer, 50°.]

Apparent Altitude.	Mean Refraction.	Apparent Altitude.	Mean Refraction.	Apparent Altitude.	Mean Refraction.	Apparent Altitude.	Mean Refraction.	Apparent Altitude.	Mean Refraction.
° ′	′ ″	° ′	′ ″	° ′	′ ″	° ′	′ ″	° ′	′ ″
		9 30	5 35.1	15 00	3 34.1	25 00	2 4.4	42 00	1 04.7
0 00	36 29.4	35	5 32.4	10	3 31.7	10	2 3.4	20	1 03.9
1 00	24 53.6	40	5 29.6	20	3 29.4	20	2 2.5	40	1 03.2
2 00	18 25.5	45	5 27.0	30	3 27.1	30	2 1.6	43 00	1 02.4
3 00	14 25.1	50	5 24.3	40	3 24.8	40	2 0.7	20	1 01.7
4 00	11 44.4	55	5 21.7	50	3 22.6	50	1 59.8	40	1 01.0
5 00	9 52.0	10 00	5 19.2	16 00	3 20.5	26 00	1 58.9	44 00	1 00.3
05	9 44.0	05	5 16.7	10	3 18.4	10	1 58.1	20	0 59.6
10	9 36.2	10	5 14.2	20	3 16.3	20	1 57.2	40	0 58.9
15	9 28.6	15	5 11.7	30	3 14.2	30	1 56.4	45 00	0 58.2
20	9 21.2	20	5 9.3	40	3 12.2	40	1 55.5	20	0 57.6
25	9 14.0	25	5 6.9	50	3 10.3	50	1 54.7	40	0 56.9
5 30	9 7.0	10 30	5 4.6	17 00	3 8.3	27 00	1 53.9	46 00	0 56.2
35	9 0.1	35	5 2.3	10	3 6.4	10	1 53.1	20	0 55.6
40	8 53.4	40	5 0.0	20	3 4.6	20	1 52.3	40	0 55.0
45	8 46.8	45	4 57.8	30	3 2.8	30	1 51.5	47 00	0 54.3
50	8 40.4	50	4 55.6	40	3 1.0	40	1 50.7	20	0 53.7
55	8 34.2	55	4 53.4	50	2 59.2	50	1 50.0	40	0 53.1
6 00	8 28.0	11 00	4 51.2	18 00	2 57.5	28 00	1 49.2	48 00	0 52.5
05	8 22.1	05	4 49.1	10	2 55.8	20	1 47.7	49 00	0 50.6
10	8 16.2	10	4 47.0	20	2 54.1	40	1 46.2	50 00	0 48.9
15	8 10.5	15	4 44.9	30	2 52.4	29 00	1 44.8	51 00	0 47.2
20	8 4.8	20	4 42.9	40	2 50.8	20	1 43.4	52 00	0 45.5
25	7 59.3	25	4 40.9	50	2 49.2	40	1 42.0	53 00	0 43.9
6 30	7 53.9	11 30	4 38.9	19 00	2 47.7	30 00	1 40.6	54 00	0 42.3
35	7 48.7	35	4 36.9	10	2 46.1	20	1 39.3	55 00	0 40.8
40	7 43.5	40	4 35.0	20	2 44.6	40	1 38.0	56 00	0 39.3
45	7 38.4	45	4 33.1	30	2 43.1	31 00	1 36.7	57 00	0 37.8
50	7 33.5	50	4 31.2	40	2 41.6	20	1 35.5	58 00	0 36.4
55	7 28.6	55	4 29.4	50	2 40.2	40	1 34.2	59 00	0 35.0
7 00	7 23.8	12 00	4 27.5	20 00	2 38.8	32 00	1 33.0	60 00	0 33.6
05	7 19.2	05	4 25.7	10	2 37.4	20	1 31.8	61 00	0 32.3
10	7 14.6	10	4 23.9	20	2 36.0	40	1 30.7	62 00	0 31.0
15	7 10.1	15	4 22.2	30	2 34.6	33 00	1 29.5	63 00	0 29.7
20	7 5.7	20	4 20.4	40	2 33.3	20	1 28.4	64 00	0 28.4
25	7 1.4	25	4 18.7	50	2 32.0	40	1 27.3	65 00	0 27.2
7 30	6 57.1	12 30	4 17.0	21 00	2 30.7	34 00	1 26.2	66 00	0 25.9
35	6 53.0	35	4 15.3	10	2 29.4	20	1 25.1	67 00	0 24.7
40	6 48.9	40	4 13.6	20	2 28.1	40	1 24.1	68 00	0 23.6
45	6 44.9	45	4 12.0	30	2 26.9	35 00	1 23.1	69 00	0 22.4
50	6 41.0	50	4 10.4	40	2 25.7	20	1 22.0	70 00	0 21.2
55	6 37.1	55	4 8.8	50	2 24.5	40	1 21.0	71 00	0 20.1
8 00	6 33.3	13 00	4 7.2	22 00	2 23.3	36 00	1 20.1	72 00	0 18.9
05	6 29.6	05	4 5.6	10	2 22.1	20	1 19.1	73 00	0 17.8
10	6 25.9	10	4 4.1	20	2 20.9	40	1 18.2	74 00	0 16.7
15	6 22.3	15	4 2.6	30	2 19.8	37 00	1 17.2	75 00	0 15.6
20	6 18.8	20	4 1.0	40	2 18.7	20	1 16.3	76 00	0 14.5
25	6 15.3	25	3 59.6	50	2 17.5	40	1 15.4	77 00	0 13.5
8 30	6 11.9	13 30	3 58.1	23 00	2 16.4	38 00	1 14.5	78 00	0 12.4
35	6 8.5	35	3 56.6	10	2 15.4	20	1 13.6	79 00	0 11.3
40	6 5.2	40	3 55.2	20	2 14.3	40	1 12.7	80 00	0 10.3
45	6 2.0	45	3 53.7	30	2 13.3	39 00	1 11.9	81 00	0 9.2
50	5 58.8	50	3 52.3	40	2 12.2	20	1 11.0	82 00	0 8.2
55	5 55.7	55	3 50.9	50	2 11.2	40	1 10.2	83 00	0 7.2
9 00	5 52.6	14 00	3 49.5	24 00	2 10.2	40 00	1 9.4	84 00	0 6.1
05	5 49.6	10	3 46.8	10	2 9.2	20	1 8.6	85 00	0 5.1
10	5 46.6	20	3 44.2	20	2 8.2	40	1 7.8	86 00	0 4.1
15	5 43.6	30	3 41.6	30	2 7.2	41 00	1 7.0	87 00	0 3.1
20	5 40.7	40	3 39.0	40	2 6.2	20	1 6.2	88 00	0 2.0
25	5 37.9	50	3 36.5	50	2 5.3	40	1 5.4	89 00	0 1.0
9 30	5 35.1	15 00	3 34.1	25 00	2 4.4	42 00	1 4.7	90 00	0 0.0

TABLE 20B.

Correction of the Sun's Apparent Altitude for Refraction and Parallax.

[Barometer, 30 inches. Fahrenheit's Thermometer, 50°.]

Apparent Altitude.	Mean Refraction and Parallax ⊙.	Apparent Altitude.	Mean Refraction and Parallax ⊙.	Apparent Altitude.	Mean Refraction and Parallax ⊙.	Apparent Altitude.	Mean Refraction and Parallax ⊙.	Apparent Altitude.	Mean Refraction and Parallax ⊙.
° ′	′ ″	° ′	′ ″	° ′	′ ″	° ′	′ ″	° ′	′ ″
		9 30	5 26	15 00	3 25	25 00	1 56	42 00	0 58
0 00	36 20	35	5 23	10	3 24	10	1 55	20	0 57
1 00	24 45	40	5 21	20	3 21	20	1 55	40	0 56
2 00	18 17	45	5 18	30	3 19	30	1 54	43 00	0 55
3 00	14 16	50	5 15	40	3 17	40	1 53	20	0 55
4 00	11 35	55	5 13	50	3 15	50	1 52	40	0 54
5 00	9 43	10 00	5 10	16 00	3 13	26 00	1 51	44 00	0 53
05	9 35	05	5 8	10	3 10	10	1 50	20	0 53
10	9 27	10	5 5	20	3 8	20	1 49	40	0 52
15	9 20	15	5 3	30	3 6	30	1 48	45 00	0 52
20	9 12	20	5 0	40	3 4	40	1 48	20	0 52
25	9 5	25	4 58	50	3 2	50	1 47	40	0 51
5 30	8 58	10 30	4 56	17 00	3 0	27 00	1 46	46 00	0 50
35	8 51	35	4 53	10	2 58	10	1 45	20	0 50
40	8 44	40	4 51	20	2 57	20	1 44	40	0 49
45	8 38	45	4 49	30	2 55	30	1 44	47 00	0 48
50	8 31	50	4 47	40	2 53	40	1 43	20	0 48
55	8 25	55	4 44	50	2 51	50	1 42	40	0 47
6 00	8 19	11 00	4 42	18 00	2 50	28 00	1 41	48 00	0 47
05	8 13	05	4 40	10	2 48	20	1 40	49 00	0 45
10	8 7	10	4 38	20	2 46	40	1 38	50 00	0 43
15	8 2	15	4 36	30	2 44	29 00	1 37	51 00	0 41
20	7 56	20	4 34	40	2 43	20	1 35	52 00	0 40
25	7 50	25	4 32	50	2 41	40	1 34	53 00	0 39
6 30	7 45	11 30	4 30	19 00	2 40	30 00	1 33	54 00	0 37
35	7 40	35	4 28	10	2 38	20	1 31	55 00	0 36
40	7 35	40	4 26	20	2 37	40	1 30	56 00	0 34
45	7 29	45	4 24	30	2 35	31 00	1 29	57 00	0 33
50	7 25	50	4 22	40	2 34	20	1 28	58 00	0 32
55	7 20	55	4 20	50	2 32	40	1 26	59 00	0 31
7 00	7 15	12 00	4 19	20 00	2 31	32 00	1 25	60 00	0 30
05	7 10	05	4 17	10	2 29	20	1 24	61 00	0 28
10	7 6	10	4 15	20	2 28	40	1 23	62 00	0 27
15	7 1	15	4 13	30	2 27	33 00	1 22	63 00	0 26
20	6 57	20	4 11	40	2 25	20	1 20	64 00	0 24
25	6 52	25	4 10	50	2 24	40	1 19	65 00	0 23
7 30	6 48	12 30	4 8	21 00	2 23	34 00	1 18	66 00	0 22
35	6 44	35	4 6	10	2 21	20	1 17	67 00	0 21
40	6 40	40	4 5	20	2 20	40	1 16	68 00	0 21
45	6 36	45	4 3	30	2 19	35 00	1 15	69 00	0 19
50	6 32	50	4 1	40	2 18	20	1 15	70 00	0 18
55	6 28	55	4 0	50	2 17	40	1 14	71 00	0 17
8 00	6 24	13 00	3 58	22 00	2 15	36 00	1 13	72 00	0 16
05	6 21	05	3 57	10	2 14	20	1 12	73 00	0 16
10	6 17	10	3 55	20	2 13	40	1 11	74 00	0 15
15	6 13	15	3 54	30	2 12	37 00	1 10	75 00	0 14
20	6 10	20	3 52	40	2 11	20	1 9	76 00	0 13
25	6 6	25	3 51	50	2 10	40	1 8	77 00	0 12
8 30	6 3	13 30	3 49	23 00	2 8	38 00	1 8	78 00	0 10
35	6 0	35	3 48	10	2 7	20	1 7	79 00	0 9
40	5 56	40	3 46	20	2 6	40	1 6	80 00	0 8
45	5 53	45	3 45	30	2 5	39 00	1 5	81 00	0 7
50	5 50	50	3 43	40	2 4	20	1 4	82 00	0 6
55	5 47	55	3 42	50	2 3	40	1 3	83 00	0 6
9 00	5 44	14 00	3 41	24 00	2 2	40 00	1 2	84 00	0 5
05	5 41	10	3 38	10	2 1	20	1 2	85 00	0 4
10	5 38	20	3 35	20	2 0	40	1 1	86 00	0 3
15	5 35	30	3 33	30	1 59	41 00	1 0	87 00	0 2
20	5 32	40	3 30	40	1 58	20	0 59	88 00	0 2
25	5 29	50	3 28	50	1 57	40	0 58	89 00	0 1
9 30	5 26	15 00	3 25	25 00	1 56	42 00	0 58	90 00	0 0

TABLE 21.

Correction of the Mean Refraction for the Height of the Barometer.

Barom. Subtract.	Mean refraction.																					Barom. Add.
	0′		1′		2′		3′		4′		5′		6′		7′		8′		9′		10′	
	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	
	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	
27.50	0	2	5	7	10	12	15	17	20	23	25	28	30	33	35	38	40	43	45	48	51	
27.55	0	2	5	7	10	12	15	17	20	22	25	27	30	32	35	37	40	42	45	47	50	
27.60	0	2	5	7	10	12	14	17	19	22	24	27	29	31	34	36	39	41	44	46	49	
27.65	0	2	5	7	9	12	14	16	19	21	24	26	28	31	33	36	38	40	43	45	48	
27.70	0	2	5	7	9	11	14	16	18	21	23	25	28	30	32	35	37	39	42	44	47	
27.75	0	2	4	7	9	11	13	16	18	20	23	25	27	29	32	34	36	39	41	43	46	
27.80	0	2	4	7	9	11	13	15	18	20	22	24	27	29	31	33	35	38	40	42	45	
27.85	0	2	4	6	9	11	13	15	17	19	22	24	26	28	30	32	35	37	39	41	44	
27.90	0	2	4	6	8	10	13	15	17	19	21	23	25	27	30	32	34	36	38	40	43	
27.95	0	2	4	6	8	10	12	14	16	18	21	23	25	27	29	31	33	35	37	39	42	
28.00	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	41	
28.05	0	2	4	6	8	10	12	14	16	18	20	22	24	25	27	29	31	33	35	37	39	
28.10	0	2	4	6	8	9	11	13	15	17	19	21	23	25	27	29	31	33	34	36	38	
28.15	0	2	4	6	7	9	11	13	15	17	19	20	22	24	26	28	30	32	34	36	37	
28.20	0	2	4	5	7	9	11	13	14	16	18	20	22	24	25	27	29	31	33	35	36	
28.25	0	2	3	5	7	9	10	12	14	16	18	19	21	23	25	26	28	30	32	34	35	
28.30	0	2	3	5	7	8	10	12	14	15	17	19	21	22	24	26	27	29	31	33	34	
28.35	0	2	3	5	7	8	10	12	13	15	17	18	20	22	23	25	27	28	30	32	33	
28.40	0	2	3	5	6	8	10	11	13	14	16	18	19	21	23	24	26	27	29	31	32	
28.45	0	2	3	5	6	8	9	11	12	14	16	17	19	20	22	23	25	27	28	30	31	
28.50	0	1	3	4	6	7	9	10	12	14	15	17	18	20	21	23	24	26	27	29	30	31.50
28.55	0	1	3	4	6	7	9	10	12	13	15	16	17	19	20	22	23	25	26	28	29	31.45
28.60	0	1	3	4	6	7	8	10	11	13	14	15	17	18	20	21	23	24	25	27	28	31.40
28.65	0	1	3	4	5	7	8	9	11	12	14	15	16	18	19	20	22	23	25	26	27	31.35
28.70	0	1	3	4	5	6	8	9	10	12	13	14	16	17	18	20	21	22	24	25	26	31.30
28.75	0	1	2	4	5	6	7	9	10	11	13	14	15	16	18	19	20	21	23	24	25	31.25
28.80	0	1	2	4	5	6	7	8	10	11	12	13	14	16	17	18	19	21	22	23	24	31.20
28.85	0	1	2	3	5	6	7	8	9	10	12	13	14	15	16	17	19	20	21	22	23	31.15
28.90	0	1	2	3	4	5	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22	31.10
28.95	0	1	2	3	4	5	6	7	8	9	11	12	13	14	15	16	17	18	19	20	21	31.05
29.00	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	31.00
29.05	0	1	2	3	4	5	6	7	8	9	10	11	11	12	13	14	15	16	17	18	19	30.95
29.10	0	1	2	3	4	4	5	6	7	8	9	10	11	12	13	14	15	15	16	17	18	30.90
29.15	0	1	2	3	3	4	5	6	7	8	9	9	10	11	12	13	14	15	15	16	17	30.85
29.20	0	1	2	2	3	4	5	6	6	7	8	9	10	10	11	12	13	14	15	15	16	30.80
29.25	0	1	1	2	3	4	4	5	6	7	8	8	9	10	11	11	12	13	14	14	15	30.75
29.30	0	1	1	2	3	3	4	5	6	6	7	8	8	9	10	11	11	12	13	13	14	30.70
29.35	0	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	10	11	12	13	13	30.65
29.40	0	1	1	2	2	3	4	4	5	5	6	7	7	8	8	9	10	10	11	12	12	30.60
29.45	0	1	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	9	10	11	11	30.55
29.50	0	0	1	1	2	2	3	3	4	5	5	6	6	7	7	8	8	9	9	10	10	30.50
29.55	0	0	1	1	2	2	3	3	4	4	5	5	5	6	6	7	7	8	8	9	9	30.45
29.60	0	0	1	1	2	2	2	3	3	4	4	4	5	5	6	6	6	7	7	8	8	30.40
29.65	0	0	1	1	1	2	2	2	3	3	4	4	4	5	5	5	6	6	6	7	7	30.35
29.70	0	0	1	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	5	6	6	30.30
29.75	0	0	0	1	1	1	1	2	2	2	3	3	3	3	4	4	4	4	5	5	5	30.25
29.80	0	0	0	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	4	4	4	30.20
29.85	0	0	0	0	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	30.15
29.90	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	30.10
29.95	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	30.05
30.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30.00
Subtract.	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	Add.
	0′		1′		2′		3′		4′		5′		6′		7′		8′		9′		10′	
Barom.	Mean refraction.																					Barom.

TABLE 22.

Correction of the Mean Refraction for the Height of the Thermometer.

Ther. Add.	Mean refraction. 0′		1′		2′		3′		4′		5′		6′		7′		8′		9′		10′	Ther. Add.
	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0′	30″	0″	30″	0″	30″	0″	30″	0″	
°	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	°
—10	0	4	8	12	16	20	24	28	33	37	41	46	50	55	60	65	70	75	80	85	90	—10
— 8	0	4	8	12	15	19	23	27	31	36	40	44	48	53	58	62	67	72	77	82	87	— 8
— 6	0	4	7	11	15	19	22	26	30	34	38	42	47	51	55	60	64	69	74	79	84	— 6
— 4	0	4	7	11	14	18	22	25	29	33	37	41	45	49	53	57	62	66	71	76	80	— 4
— 2	0	3	7	10	14	17	21	24	28	31	35	39	43	47	51	55	59	64	68	72	77	— 2
0	0	3	7	10	13	16	20	23	27	30	34	37	41	45	49	53	57	61	65	69	74	0
2	0	3	6	9	12	16	19	22	25	29	32	36	39	43	47	50	54	58	62	66	70	2
4	0	3	6	9	12	15	18	21	24	28	31	34	37	41	44	48	52	55	59	63	67	4
6	0	3	6	8	11	14	17	20	23	26	29	32	36	39	42	46	49	53	56	60	64	6
8	0	3	5	8	11	14	16	19	22	25	28	31	34	37	40	43	47	50	54	57	61	8
10	0	3	5	8	10	13	15	18	21	24	26	29	32	35	38	41	44	48	51	54	58	10
11	0	2	5	7	10	13	15	18	20	23	26	28	31	34	37	40	43	46	49	53	56	11
12	0	2	5	7	10	12	15	17	20	22	25	28	30	33	36	39	42	45	48	51	54	12
13	0	2	5	7	9	12	14	17	19	22	24	27	30	32	35	38	41	44	47	50	53	13
14	0	2	5	7	9	11	14	16	19	21	24	26	29	31	34	37	40	42	45	48	51	14
15	0	2	4	7	9	11	13	16	18	20	23	25	28	30	33	36	38	41	44	47	50	15
16	0	2	4	6	9	11	13	15	18	20	22	25	27	29	32	35	37	40	43	45	48	16
17	0	2	4	6	8	10	13	15	17	19	21	24	26	29	31	33	36	39	41	44	47	17
18	0	2	4	6	8	10	12	14	16	19	21	23	25	28	30	32	35	37	40	43	45	18
19	0	2	4	6	8	10	12	14	16	18	20	22	24	27	29	31	34	36	39	41	44	19
20	0	2	4	6	8	9	11	13	15	17	19	22	24	26	28	30	33	35	37	40	42	20
21	0	2	4	5	7	9	11	13	15	17	19	21	23	25	27	29	31	34	36	38	41	21
22	0	2	3	5	7	9	11	12	14	16	18	20	22	24	26	28	30	32	35	37	39	22
23	0	2	3	5	7	8	10	12	14	15	17	19	21	23	25	27	29	31	33	36	38	23
24	0	2	3	5	6	8	10	11	13	15	17	18	20	22	24	26	28	30	32	34	36	24
25	0	2	3	5	6	8	9	11	13	14	16	18	19	21	23	25	27	29	31	33	35	25
26	0	1	3	4	6	7	9	11	12	14	15	17	19	20	22	24	26	28	29	31	33	26
27	0	1	3	4	6	7	9	10	12	13	15	16	18	19	21	23	25	26	28	30	32	27
28	0	1	3	4	5	7	8	10	11	12	14	15	17	19	20	22	23	25	27	29	30	28
29	0	1	3	4	5	6	8	9	11	12	13	15	16	18	19	21	22	24	26	27	29	29
30	0	1	2	4	5	6	7	9	10	11	13	14	15	17	18	20	21	23	24	26	28	30
31	0	1	2	3	5	6	7	8	9	11	12	13	15	16	17	19	20	22	23	25	26	31
32	0	1	2	3	4	6	7	8	9	10	11	13	14	15	16	18	19	20	22	23	25	32
33	0	1	2	3	4	5	6	7	8	10	11	12	13	14	15	17	18	19	21	22	23	33
34	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19	21	22	34
35	0	1	2	3	4	5	6	6	7	8	9	10	11	13	14	15	16	17	18	19	20	35
36	0	1	2	3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	36
37	0	1	2	2	3	4	5	6	6	7	8	9	10	11	12	13	14	15	16	17	18	37
38	0	1	1	2	3	4	4	5	6	7	7	8	9	10	11	12	13	13	14	15	16	38
39	0	1	1	2	3	3	4	5	5	6	7	8	8	9	10	11	11	12	13	14	15	39
40	0	1	1	2	2	3	4	4	5	6	6	7	8	8	9	10	10	11	12	13	13	40
41	0	1	1	2	2	3	3	4	4	5	6	6	7	7	8	9	9	10	11	11	12	41
42	0	0	1	1	2	2	3	3	4	4	5	5	6	7	7	8	8	9	9	10	11	42
43	0	0	1	1	2	2	3	3	3	4	4	5	5	6	6	7	7	8	8	9	9	43
44	0	0	1	1	1	2	2	3	3	3	4	4	4	5	5	6	6	7	7	8	8	44
45	0	0	1	1	1	1	2	2	2	3	3	3	4	4	4	5	5	6	6	6	7	45
46	0	0	0	1	1	1	1	2	2	2	2	2	3	3	4	4	4	4	5	5	5	46
47	0	0	0	1	1	1	1	1	1	2	2	2	2	2	3	3	3	3	4	4	4	47
48	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	48
49	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	49
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
Add.	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	Add.
Ther.	0′		1′		2′		3′		4′		5′		6′		7′		8′		9′		10′	Ther.
	Mean refraction.																					

TABLE 22.

Correction of the Mean Refraction for the Height of the Thermometer.

Ther. Subt.	Mean refraction.																					Ther. Subt.
	0′		1′		2′		3′		4′		5′		6′		7′		8′		9′		10′	
	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	
°	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	°
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
51	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	51
52	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	52
53	0	0	0	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	4	4	53
54	0	0	0	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	5	5	5	54
55	0	0	1	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	55
56	0	0	1	1	1	2	2	2	3	3	4	4	4	5	5	6	6	6	7	7	8	56
57	0	0	1	1	2	2	2	3	3	4	4	5	5	6	6	6	7	8	8	8	9	57
58	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	9	9	10	10	58
59	0	1	1	2	2	3	3	4	4	5	5	6	6	7	8	8	9	10	10	11	12	59
60	0	1	1	2	2	3	3	4	5	5	6	7	7	8	9	9	10	11	11	12	13	60
61	0	1	1	2	3	3	4	4	5	6	7	7	8	9	9	10	11	12	12	13	14	61
62	0	1	1	2	3	3	4	5	6	6	7	8	9	9	10	11	12	13	14	15	15	62
63	0	1	1	2	3	4	5	5	6	7	8	8	9	10	11	12	13	14	15	16	17	63
64	0	1	2	2	3	4	5	6	7	7	8	9	10	11	12	13	14	15	16	17	18	64
65	0	1	2	3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	65
66	0	1	2	3	4	5	6	6	7	8	9	10	11	12	14	15	16	17	18	19	20	66
67	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	22	67
68	0	1	2	3	4	5	6	7	8	9	11	11	13	14	15	16	18	19	20	22	23	68
69	0	1	2	3	4	5	7	8	9	10	11	12	13	15	16	17	19	20	21	23	24	69
70	0	1	2	3	5	6	7	8	9	10	12	12	14	16	17	18	20	21	22	24	25	70
71	0	1	2	4	5	6	7	8	10	11	12	13	15	16	18	19	20	22	23	25	27	71
72	0	1	2	4	5	6	8	9	10	11	13	14	16	17	18	20	21	23	25	26	28	72
73	0	1	3	4	5	7	8	9	11	12	13	14	16	18	19	21	22	24	26	27	29	73
74	0	1	3	4	5	7	8	10	11	12	14	15	17	18	20	22	23	25	27	28	30	74
75	0	1	3	4	6	7	8	10	11	13	14	16	18	19	21	22	24	26	28	29	31	75
76	0	1	3	4	6	7	9	10	12	13	15	16	18	20	22	23	25	27	29	31	32	76
77	0	1	3	5	6	8	9	11	12	14	16	17	19	21	22	24	26	28	30	32	34	77
78	0	2	3	5	6	8	9	11	13	14	16	18	20	21	23	25	27	29	31	33	35	78
79	0	2	3	5	6	8	10	11	13	15	17	18	20	22	24	26	28	30	32	34	36	79
80	0	2	3	5	7	8	10	12	14	15	17	19	21	23	25	27	29	31	33	35	37	80
81	0	2	3	5	7	9	10	12	14	16	18	20	21	24	26	28	30	32	34	36	38	81
82	0	2	4	5	7	9	11	13	14	16	18	20	22	24	26	28	31	33	35	37	40	82
83	0	2	4	5	7	9	11	13	15	17	19	21	23	25	27	29	31	34	36	38	41	83
84	0	2	4	6	8	9	11	13	15	17	19	21	23	26	28	30	32	35	37	39	42	84
85	0	2	4	6	8	10	12	14	16	18	20	22	24	26	29	31	33	36	38	40	43	85
86	0	2	4	6	8	10	12	14	16	18	20	23	25	27	29	32	34	37	39	42	44	86
87	0	2	4	6	8	10	12	14	17	19	21	23	25	28	30	32	35	38	40	43	45	87
88	0	2	4	6	8	10	13	15	17	19	21	24	26	28	31	33	36	38	41	44	46	88
89	0	2	4	6	9	11	13	15	17	20	22	24	27	29	32	34	37	39	42	45	48	89
90	0	2	4	7	9	11	13	16	18	20	23	25	27	30	32	35	38	40	43	46	49	90
91	0	2	4	7	9	11	14	16	18	21	23	25	28	31	33	36	39	41	44	47	50	91
92	0	2	5	7	9	11	14	16	19	21	24	26	29	31	34	37	39	42	45	48	51	92
93	0	2	5	7	9	12	14	17	19	22	24	27	29	32	35	37	40	43	46	49	52	93
94	0	2	5	7	10	12	14	17	19	22	25	27	30	33	35	38	41	44	47	50	53	94
95	0	2	5	7	10	12	15	17	20	22	25	28	30	33	36	39	42	45	48	51	54	95
96	0	2	5	7	10	12	15	18	20	23	26	28	31	34	37	40	43	46	49	52	55	96
97	0	3	5	8	10	13	15	18	21	23	26	29	32	35	38	41	44	47	50	53	56	97
98	0	3	5	8	10	13	16	18	21	24	27	29	32	35	38	41	44	48	51	54	58	98
99	0	3	5	8	11	13	16	19	21	24	27	30	33	36	39	42	45	49	52	55	59	99
100	0	3	5	8	11	13	16	19	22	25	28	31	34	37	40	43	46	50	53	56	60	100
Subt.	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	30″	0″	Subt.
	0′		1′		2′		3′		4′		5′		6′		7′		8′		9′		10′	
Ther.	Mean refraction.																					Ther.

TABLE 23.

Correction of the Moon's Altitude for parallax and refraction corresponding to a mean value of the horizontal parallax, 57′ 30″.

Moon's alt.	Corr.	Moon's alt.	Corr.	Moon's alt.	Corr.	Moon's alt.	Corr.
°	′	°	′	°	′	°	′
10	51	31	48	51	35	71	18
11	52	32	47	52	35	72	17
12	52	33	47	53	34	73	17
13	52	34	46	54	33	74	16
14	52	35	46	55	32	75	15
15	52	36	45	56	32	76	14
16	52	37	45	57	31	77	13
17	52	38	44	58	30	78	12
18	52	39	44	59	29	79	11
19	52	40	43	60	28	80	10
20	51						
21	51	41	42	61	27	81	9
22	51	42	42	62	26	82	8
23	51	43	41	63	26	83	7
24	50	44	40	64	25	84	6
25	50	45	40	65	24	85	5
26	50	46	39	66	23	86	4
27	49	47	38	67	22	87	3
28	49	48	38	68	21	88	2
29	49	49	37	69	20	89	1
30	48	50	36	70	19	90	0

TABLE 24.

Correction of the Moon's Apparent Altitude for Parallax and Refraction.

[Barometer, 30 inches.—Fahrenheit's Thermometer, 50°.]

Moon's app. alt.	Horizontal parallax.								Seconds of parallax.	Correction for seconds of parallax.—Add.					Corr. for minutes of alt.
	54′	55′	56′	57′	58′	59′	60′	61′		0″	2″	4″	6″	8″	
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″	″	″	″	″	″	
5 0	43 56	44 56	45 56	46 56	47 56	48 55	49 55	50 55	0	0	2	4	6	8	
10	44 11	45 11	46 11	47 11	48 11	49 10	50 10	51 10	10	10	12	14	16	18	
20	25	25	25	25	25	24	24	24	20	20	22	24	26	28	
30	39	39	38	38	38	38	37	37	30	30	32	34	36	38	
40	52	51	51	51	51	51	51	51	40	40	42	44	46	48	
50	45 4	46 3	47 3	48 3	49 3	50 3	51 3	52 3	50	50	52	54	56	58	
6 0	45 15	46 15	47 14	48 14	49 14	50 13	51 13	52 13	0	0	2	4	6	8	
10	26	26	25	25	25	25	25	25	10	10	12	14	16	18	
20	36	36	36	35	35	34	34	34	20	20	22	24	26	28	
30	46	46	45	45	45	44	44	44	30	30	32	34	36	38	
40	55	55	55	54	54	54	53	53	40	40	42	44	46	48	
50	46 4	47 3	48 3	49 3	50 3	51 2	52 1	53 1	50	50	52	54	56	58	
7 0	46 12	47 12	48 12	49 12	50 12	51 11	52 11	53 10	0	0	2	4	6	8	
10	21	20	20	20	19	18	18	18	10	10	12	14	16	18	
20	29	28	28	27	27	26	25	25	20	20	22	24	26	28	
30	36	36	35	35	34	34	34	33	30	30	32	34	36	38	
40	43	42	42	41	41	40	40	40	40	40	42	44	46	48	
50	50	49	48	48	48	47	46	46	50	50	52	54	56	58	Add.
8 0	46 56	47 56	48 55	49 54	50 54	51 54	52 53	53 53	0	0	2	4	6	8	1′ 1″
10	47 2	48 2	49 1	50 0	51 0	59	59	58	10	10	12	14	16	18	2 1
20	8	7	7	6	6	52 5	53 4	54 4	20	20	22	24	26	28	3 2
30	13	13	12	11	11	10	10	9	30	30	32	34	36	38	4 2
40	19	18	17	17	16	16	15	14	40	40	42	44	46	48	5 3
50	24	23	22	22	21	20	19	19	50	50	52	54	56	58	6 4
9 0	47 28	48 27	49 26	50 26	51 25	52 24	53 24	54 23	0	0	2	4	6	8	7 4
10	33	32	31	30	30	29	28	27	10	10	12	14	16	18	8 5
20	37	36	35	34	34	33	32	32	20	20	22	24	26	28	9 5
30	41	41	40	39	38	37	37	36	30	30	32	34	36	38	
40	45	44	43	43	42	41	40	39	40	40	42	44	46	48	
50	49	48	47	46	46	45	44	44	50	49	51	53	55	57	

TABLE 24.

Correction of the Moon's Apparent Altitude for Parallax and Refraction.

[Barometer 30 inches.—Fahrenheit's Thermometer 50°.]

Moon's app. alt.	Horizontal parallax.								Seconds of parallax.	Correction for seconds of parallax.—Add.					Corr. for minutes of alt.
	54′	55′	56′	57′	58′	59′	60′	61′		0″	2″	4″	6″	8″	
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″	″	″	″	″	″	Add.
10 0	47 53	48 52	49 51	50 50	51 50	52 48	53 48	54 47	0	0	2	4	6	8	1′ 0″
10	56	55	54	53	52	51	50	50	10	10	12	14	16	18	2 1
20	59	58	57	56	55	55	54	53	20	20	22	24	26	28	3 1
30	48 2	49 1	50 0	59	58	57	56	55	30	29	31	33	35	37	4 1
40	5	4	2	51 2	52 1	53 0	59	58	40	39	41	43	45	47	5 2
50	7	6	5	4	4	2	54 1	55 0	50	49	51	53	55	57	6 2
11 0	48 10	49 9	50 8	51 7	52 7	53 5	54 4	55 3	0	0	2	4	6	8	7 2
10	12	11	10	9	9	7	6	5	10	10	12	14	16	18	8 2
20	15	14	12	12	11	9	8	7	20	20	22	24	26	28	9 3
30	17	16	14	13	13	11	10	9	30	29	31	33	35	37	
40	19	18	17	15	15	13	12	11	40	39	41	43	45	47	
50	21	20	18	17	17	15	14	13	50	49	51	53	55	57	
12 0	48 22	49 21	50 19	51 18	52 17	53 17	54 15	55 14	0	0	2	4	6	8	
10	24	23	21	20	19	18	16	15	10	10	12	14	16	18	
20	26	25	23	22	21	20	18	17	20	20	22	24	25	27	
30	27	26	24	23	22	20	19	18	30	29	31	33	35	37	
40	28	27	25	24	23	21	20	19	40	39	41	43	45	47	
50	29	28	26	25	24	22	21	20	50	49	51	53	55	57	
13 0	48 30	49 29	50 27	51 26	52 25	53 23	54 22	55 20	0	0	2	4	6	8	1 0
10	31	30	28	27	26	24	22	21	10	10	12	14	16	18	2 0
20	32	31	29	27	26	24	23	21	20	19	21	23	25	27	3 0
30	33	32	30	28	27	25	23	22	30	29	31	33	35	37	4 0
40	34	32	30	29	28	26	24	22	40	39	41	43	45	47	5 0
50	35	33	31	30	28	26	25	23	50	49	51	53	55	57	6 0
14 0	48 35	49 33	50 31	51 30	52 28	53 26	54 25	55 23	0	0	2	4	6	8	7 0
10	35	34	32	30	28	26	25	23	10	10	12	14	16	18	8 0
20	36	34	32	30	29	27	25	24	20	19	21	23	25	27	9 0
30	36	34	32	30	29	27	25	23	30	29	31	33	35	37	
40	36	34	32	30	29	27	25	23	40	39	41	43	45	47	
50	36	34	32	30	29	27	25	23	50	49	51	53	55	57	
15 0	48 36	49 35	50 33	51 31	52 29	53 27	54 25	55 23	0	0	2	4	6	8	
10	36	35	32	30	28	26	24	22	10	10	12	14	16	18	
20	36	35	32	30	28	26	24	22	20	19	21	23	25	27	
30	36	34	31	29	28	25	23	21	30	29	31	33	35	37	
40	36	34	31	29	27	25	23	21	40	39	41	43	45	47	
50	35	33	30	28	26	24	21	19	50	49	51	53	55	57	
16 0	48 35	49 32	50 29	51 27	52 25	53 23	54 20	55 18	0	0	2	4	6	8	
10	34	32	29	27	25	23	20	18	10	10	12	13	15	17	
20	34	32	29	27	25	22	20	17	20	19	21	23	25	27	
30	33	31	28	26	24	21	19	16	30	29	31	33	35	36	
40	33	31	28	25	23	21	18	16	40	38	40	42	44	46	
50	32	30	27	24	22	20	17	15	50	48	50	52	54	56	Sub.
17 0	48 31	49 29	50 26	51 23	52 21	53 18	54 16	55 13	0	0	2	4	6	8	1′ 0″
10	30	28	25	22	20	17	14	12	10	10	12	13	15	17	2 0
20	28	26	23	20	18	15	12	10	20	19	21	23	25	27	3 0
30	27	25	22	19	17	14	11	9	30	29	31	33	34	36	4 0
40	26	24	21	18	16	13	10	7	40	38	40	42	44	46	5 1
50	26	23	20	17	15	12	9	6	50	48	50	52	53	55	6 1
18 0	48 24	49 21	50 18	51 15	52 13	53 10	54 7	55 4	0	0	2	4	6	8	7 1
10	23	20	17	14	12	9	6	3	10	10	11	13	15	17	8 1
20	22	19	16	13	11	8	5	2	20	19	21	23	25	27	9 1
30	21	18	15	12	10	6	3	0	30	29	30	32	34	36	
40	20	17	14	10	8	4	1	54 58	40	38	40	42	44	46	
50	18	15	12	9	6	2	53 59	56	50	48	50	51	53	55	
19 0	48 16	49 13	50 10	51 7	52 4	53 0	53 57	54 55	0	0	2	4	6	8	
10	15	12	8	5	2	52 59	55	53	10	10	11	13	15	17	
20	13	10	6	3	0	57	53	51	20	19	21	23	25	27	
30	12	8	5	2	51 58	55	51	49	30	29	30	32	34	36	
40	10	6	3	0	56	53	49	47	40	38	40	42	44	46	
50	9	5	2	50 58	55	51	48	45	50	48	50	51	53	55	

TABLE 24.

Correction of the Moon's Apparent Altitude for Parallax and Refraction.

[Barometer 30 inches.—Fahrenheit's Thermometer 50°.]

Moon's app. alt.	Horizontal parallax.								Seconds of parallax.	Correction for seconds of parallax.—Add.					Corr. for minutes of alt.
	54′	55′	56′	57′	58′	59′	60′	61′		0″	2″	4″	6″	8″	
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″	″	″	″	″	″	Sub.
20 0	48 6	49 3	49 59	50 56	51 52	52 49	53 45	54 42	0	0	2	4	6	8	1′ 0″
10	5	2	58	55	51	47	43	40	10	9	11	13	15	17	2 0
20	3	0	56	52	49	45	41	37	20	19	21	23	24	26	3 1
30	1	48 58	53	50	46	42	38	35	30	28	30	32	34	36	4 1
40	59	56	52	48	44	40	36	33	40	38	39	41	43	45	5 1
50	57	54	50	46	42	38	34	30	50	47	49	51	53	54	6 1
21 0	47 55	48 51	49 47	50 43	51 39	52 35	53 31	54 28	0	0	2	4	6	7	7 1
10	53	49	45	41	37	33	29	26	10	9	11	13	15	17	8 1
20	51	47	43	39	35	31	27	23	20	19	21	22	24	26	9 2
30	48	44	40	36	32	28	24	20	30	28	30	32	34	35	
40	46	42	38	33	29	25	21	17	40	37	39	41	43	45	
50	43	39	35	31	27	22	18	14	50	47	49	50	52	54	
22 0	47 42	48 37	49 33	50 29	51 25	52 20	53 16	54 11	0	0	2	4	6	7	
10	40	35	30	26	22	17	13	8	10	9	11	13	15	17	
20	37	32	27	23	19	14	10	5	20	19	20	22	24	26	
30	34	30	25	20	16	11	7	3	30	28	30	31	33	35	
40	32	27	22	18	13	9	4	0	40	37	39	41	43	45	
50	29	25	20	15	11	6	1	53 57	50	46	48	50	52	54	
23 0	47 27	48 22	49 17	50 13	51 8	52 3	52 58	53 54	0	0	2	4	6	7	
10	25	20	15	10	5	0	55	51	10	9	11	13	15	17	
20	22	17	12	7	2	51 57	52	48	20	18	20	22	24	26	
30	19	14	9	4	0	54	49	45	30	28	29	31	33	35	
40	16	11	6	1	50 57	51	46	42	40	37	39	40	42	44	
50	13	8	3	49 58	54	48	43	38	50	46	48	50	51	53	
24 0	47 10	48 5	49 0	49 55	50 50	51 45	52 40	53 35	0	0	2	4	5	7	1 0
10	8	3	48 57	52	47	42	37	32	10	9	11	13	15	16	2 1
20	5	0	54	49	44	39	33	28	20	18	20	22	24	26	3 1
30	2	47 57	51	46	41	35	30	24	30	27	29	30	32	34	4 1
40	46 59	54	48	43	38	32	27	21	40	36	38	40	42	44	5 2
50	56	51	45	40	35	29	23	18	50	46	47	49	51	53	6 2
25 0	46 53	47 48	48 42	49 37	50 31	51 26	52 20	53 14	0	0	2	4	5	7	7 2
10	50	45	39	33	28	22	16	10	10	9	11	13	14	16	8 2
20	46	41	35	29	24	18	12	6	20	18	20	22	24	25	9 3
30	43	38	32	26	20	14	8	3	30	27	29	31	33	34	
40	40	34	28	23	17	11	5	52 59	40	36	38	40	42	43	
50	37	31	25	19	14	7	1	56	50	45	47	49	51	52	
26 0	46 34	47 28	48 22	49 16	50 10	51 4	51 58	52 52	0	0	2	4	5	7	
10	31	25	19	13	7	1	54	48	10	9	11	13	14	16	
20	27	21	15	9	3	50 57	50	44	20	18	20	22	23	25	
30	24	18	12	6	49 59	53	46	40	30	27	29	31	32	34	
40	20	14	8	2	55	49	42	36	40	36	38	39	41	43	
50	17	11	4	48 58	51	45	38	32	50	45	47	48	50	52	
27 0	46 14	47 7	48 1	48 54	49 48	50 41	51 35	52 28	0	0	2	4	5	7	1 0
10	11	4	47 58	51	44	37	31	24	10	9	11	12	14	16	2 1
20	7	1	54	47	40	33	27	20	20	18	20	21	23	25	3 1
30	3	46 57	50	43	36	29	23	16	30	27	28	30	32	34	4 1
40	45 59	53	46	39	32	25	19	12	40	36	37	39	41	43	5 2
50	56	49	42	35	28	21	15	8	50	44	46	48	50	52	6 2
28 0	45 53	46 46	47 38	48 31	49 24	50 17	51 11	52 4	0	0	2	4	5	7	7 3
10	49	42	34	27	20	13	6	51 59	10	9	11	12	14	16	8 3
20	45	38	30	23	16	9	2	55	20	18	19	21	23	25	9 3
30	41	34	26	19	12	5	50 57	50	30	26	28	30	32	33	
40	37	30	23	15	8	1	54	46	40	35	37	39	41	42	
50	34	26	19	11	4	49 57	49	42	50	44	46	48	49	51	
29 0	45 30	46 22	47 15	48 7	49 0	49 53	50 45	51 38	0	0	2	4	5	7	
10	26	18	11	3	48 56	49	40	34	10	9	10	12	14	16	
20	22	14	7	47 59	52	44	36	29	20	17	19	21	23	24	
30	18	10	2	55	47	39	31	24	30	26	28	30	31	33	
40	14	6	46 58	51	43	35	27	20	40	35	37	38	40	42	
50	11	3	55	47	39	31	23	15	50	44	45	47	49	51	

TABLE 24.

Correction of the Moon's Apparent Altitude for Parallax and Refraction.

[Barometer 30 inches.—Fahrenheit's Thermometer 50°.]

Moon's app. alt.		Horizontal parallax.								Seconds of parallax.	Correction for seconds of parallax.—Add.					Corr. for minutes of alt.	
		54′	55′	56′	57′	58′	59′	60′	61′		0″	2″	4″	6″	8″		
°	′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″	″	″	″	″	″	Sub.	
30	0	45 6	45 57	46 50	47 42	48 34	49 26	50 18	51 10	0	0	2	3	5	7	1′	0″
	10	2	54	46	38	30	22	13	6	10	9	10	12	14	16	2	1
	20	44 58	50	42	34	26	18	9	1	20	17	19	21	23	24	3	1
	30	54	46	37	29	21	13	4	50 56	30	26	28	29	31	33	4	2
	40	50	42	33	25	17	8	0	52	40	35	36	38	40	42	5	2
	50	45	38	29	21	12	4	49 55	47	50	43	45	47	49	50	6	3
31	0	44 41	45 33	46 24	47 16	48 7	48 59	49 50	50 42	0	0	2	3	5	7	7	3
	10	37	29	20	12	2	54	45	37	10	9	10	12	14	15	8	4
	20	33	24	15	7	47 58	49	40	32	20	17	19	21	22	24	9	4
	30	28	20	11	2	54	45	36	27	30	26	27	29	31	32		
	40	24	16	7	46 58	49	40	31	22	40	34	36	38	39	41		
	50	20	11	2	53	44	35	26	17	50	43	44	46	48	50		
32	0	44 15	45 7	45 58	46 49	47 40	48 31	49 22	50 13	0	0	2	3	5	7		
	10	11	3	53	44	35	26	17	8	10	8	10	12	14	15		
	20	7	44 58	48	39	30	21	11	2	20	17	19	20	22	24		
	30	3	53	44	34	25	16	6	49 57	30	25	27	29	30	32		
	40	43 58	48	39	29	20	11	1	52	40	34	35	37	39	41		
	50	54	44	34	24	15	6	48 56	47	50	42	44	46	47	49		
33	0	43 48	44 39	45 29	46 19	47 10	48 0	48 50	49 41	0	0	2	3	5	7	1	0
	10	44	34	25	15	5	47 55	45	36	10	8	10	12	13	15	2	1
	20	40	30	20	10	0	50	40	31	20	17	18	20	22	23	3	1
	30	35	25	15	5	46 55	45	35	25	30	25	27	28	30	32	4	2
	40	30	20	10	0	50	40	30	20	40	33	35	37	38	40	5	2
	50	25	15	5	45 55	45	35	24	14	50	42	43	45	47	48	6	3
34	0	43 21	44 11	45 0	45 50	46 40	47 30	48 19	49 9	0	0	2	3	5	7	7	3
	10	16	6	44 55	45	34	24	14	3	10	8	10	12	13	15	8	4
	20	11	1	50	40	29	19	9	48 58	20	17	18	20	21	23	9	4
	30	6	43 56	45	35	24	13	3	52	30	25	26	28	30	31		
	40	1	51	40	30	19	8	47 58	47	40	33	35	36	38	40		
	50	42 56	46	35	24	14	3	52	42	50	41	43	44	46	48		
35	0	42 52	43 41	44 30	45 19	46 9	46 58	47 47	48 36	0	0	2	3	5	7		
	10	47	36	25	14	3	52	41	30	10	8	10	11	13	15		
	20	42	31	20	9	45 58	47	36	25	20	16	18	20	21	23		
	30	37	26	15	3	52	41	30	19	30	24	26	28	29	31		
	40	32	21	10	44 58	47	36	25	14	40	33	34	36	38	39		
	50	27	16	4	53	42	30	19	8	50	41	42	44	46	47		
36	0	42 22	43 11	43 59	44 48	45 37	46 25	47 14	48 2	0	0	2	3	5	6		
	10	17	5	54	42	31	19	8	47 56	10	8	10	11	13	14	1	1
	20	12	0	48	37	25	14	2	50	20	16	18	19	21	23	2	1
	30	7	42 55	43	31	20	8	46 56	44	30	24	26	27	29	31	3	2
	40	1	50	38	26	14	2	50	39	40	32	34	35	37	39	4	2
	50	41 56	44	32	20	8	45 56	44	33	50	40	42	43	45	47	5	3
37	0	41 51	42 39	43 27	44 15	45 3	45 51	46 39	47 27	0	0	2	3	5	6	6	3
	10	46	34	21	9	44 57	45	33	21	10	8	10	11	13	14	7	4
	20	41	29	16	4	52	40	27	15	20	16	17	19	21	22	8	4
	30	35	23	11	43 58	46	34	21	9	30	24	25	27	29	30	9	5
	40	30	18	5	53	40	28	15	3	40	32	33	35	37	38		
	50	25	12	42 59	47	34	22	9	46 57	50	40	41	43	45	46		
38	0	41 19	42 7	42 54	43 41	44 29	45 16	46 3	46 51	0	0	2	3	5	6		
	10	14	2	49	36	23	10	45 57	45	10	8	9	11	13	14		
	20	8	41 56	43	30	17	4	51	38	20	16	17	19	20	22		
	30	3	51	38	24	12	44 58	45	32	30	23	25	27	28	30		
	40	40 58	45	32	18	6	52	39	26	40	31	33	35	36	38		
	50	52	39	26	13	0	46	33	20	50	39	41	42	44	46		
39	0	40 47	41 33	42 20	43 7	43 54	44 40	45 27	46 13	0	0	2	3	5	6		
	10	42	28	15	1	48	34	21	7	10	8	9	11	12	14	1	1
	20	36	23	9	42 55	42	28	15	1	20	15	17	19	20	22	2	1
	30	30	17	3	49	36	22	8	45 54	30	23	25	26	28	29	3	2
	40	25	11	41 57	43	30	16	2	48	40	31	32	34	36	37	4	2
	50	19	5	51	37	23	9	44 55	42	50	39	40	42	43	45	5	3

TABLE 24.

Correction of the Moon's Apparent Altitude for Parallax and Refraction.

[Barometer 30 inches.—Fahrenheit's Thermometer 50°.]

Moon's app. alt.	Horizontal parallax.								Seconds of parallax.	Correction for seconds of parallax.—Add.					Corr. for minutes of alt.	
	54′	55′	56′	57′	58′	59′	60′	61′		0″	2″	4″	6″	8″		
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″	″	″	″	″	″	Sub.	
40 0	40 14	41 0	41 46	42 32	43 18	44 4	44 50	45 36	0	0	2	3	5	6	6′	3″
10	8	40 54	39	25	11	43 57	43	29	10	8	9	11	12	14	7	4
20	2	48	33	19	5	50	36	22	20	15	17	18	20	21	8	5
30	39 56	42	28	13	42 59	44	30	16	30	23	24	26	27	29	9	5
40	50	36	22	7	53	38	24	9	40	30	32	34	35	37		
50	45	30	16	1	47	32	18	3	50	38	40	41	43	44		
41 0	39 39	40 24	41 10	41 55	42 41	43 26	44 11	44 56	0	0	2	3	5	6		
10	33	18	4	49	34	19	4	49	10	8	9	11	12	14		
20	27	12	40 58	43	28	13	43 58	43	20	15	17	18	20	21		
30	21	6	51	36	22	7	51	37	30	23	24	26	27	29		
40	16	0	45	30	16	0	45	30	40	30	32	33	35	36		
50	10	39 54	39	24	9	42 53	38	23	50	38	39	41	42	44		
42 0	39 4	39 48	40 33	41 17	42 2	42 47	43 31	44 16	0	0	1	3	4	6		
10	38 58	42	27	11	41 56	41	25	10	10	7	9	10	12	13	1	1
20	52	36	21	5	50	34	18	3	20	15	16	18	19	21	2	1
30	46	30	14	40 58	43	27	11	43 56	30	22	24	25	27	28	3	2
40	40	24	8	52	36	21	5	49	40	30	31	33	34	36	4	2
50	34	18	2	46	30	14	42 58	42	50	37	38	40	41	43	5	3
43 0	38 28	39 12	39 56	40 40	41 24	42 8	42 52	43 36	0	0	1	3	4	6	6	4
10	22	6	50	34	18	1	45	29	10	7	9	10	12	13	7	4
20	16	38 59	43	27	11	41 54	38	22	20	15	16	18	19	20	8	5
30	10	53	37	20	5	48	31	15	30	22	23	25	26	28	9	5
40	4	47	30	14	40 58	41	24	8	40	29	31	32	34	35		
50	37 57	41	24	7	51	34	17	1	50	37	38	39	41	42		
44 0	37 51	38 35	39 18	40 1	40 44	41 27	42 10	42 54	0	0	1	3	4	6		
10	45	28	11	39 54	37	20	3	46	10	7	9	10	11	13		
20	38	21	4	47	30	13	41 56	39	20	14	16	17	19	20		
30	32	15	38 58	41	24	7	49	32	30	21	23	24	26	27		
40	26	9	51	34	17	0	42	25	40	29	30	31	33	34		
50	20	2	44	27	10	40 53	35	18	50	36	37	39	40	41		
45 0	37 14	37 56	38 38	39 21	40 3	40 46	41 28	42 11	0	0	1	3	4	6	1	1
10	7	49	31	14	39 56	39	21	3	10	7	8	10	11	13	2	1
20	0	43	25	7	49	32	14	41 56	20	14	15	17	18	20	3	2
30	36 54	37	18	1	43	25	7	49	30	21	23	24	25	27	4	3
40	48	30	11	38 54	36	18	0	42	40	28	30	31	32	34	5	3
50	41	23	4	47	29	11	40 52	34	50	35	37	38	39	41	6	4
46 0	36 35	37 17	37 58	38 40	39 22	40 4	40 45	41 27	0	0	1	3	4	6	7	5
10	29	10	51	33	15	39 57	38	20	10	7	8	10	11	12	8	5
20	22	3	44	26	8	49	31	12	20	14	15	17	18	19	9	6
30	16	36 57	38	20	1	42	24	5	30	21	22	23	25	26		
40	9	50	32	13	38 54	35	17	40 58	40	28	29	30	32	33		
50	2	43	25	6	47	28	9	50	50	35	36	37	39	40		
47 0	35 56	36 37	37 18	37 59	38 40	39 21	40 2	40 43	0	0	1	3	4	5		
10	49	30	11	52	34	14	39 55	36	10	7	8	10	11	12		
20	42	23	4	45	26	6	47	28	20	14	15	16	18	19		
30	36	17	36 57	38	19	38 59	40	21	30	20	22	23	24	26		
40	30	10	50	31	12	52	32	13	40	27	29	30	31	33		
50	23	3	43	24	5	45	25	5	50	34	35	37	38	39		
48 0	35 16	35 56	36 36	37 17	37 57	38 37	39 17	39 58	0	0	1	3	4	5	1	1
10	10	50	30	10	50	30	10	50	10	7	8	9	11	12	2	1
20	3	43	23	2	43	22	2	42	20	13	15	16	17	19	3	2
30	34 56	36	16	36 55	35	15	38 55	34	30	20	21	23	24	25	4	3
40	49	29	9	48	28	8	48	27	40	27	28	29	31	32	5	3
50	42	22	1	41	21	0	40	19	50	33	35	36	37	39	6	4
49 0	34 35	35 15	35 54	36 34	37 13	37 53	38 32	39 11	0	0	1	3	4	5	7	5
10	29	8	47	27	6	46	25	4	10	7	8	9	10	12	8	5
20	22	1	40	20	36 59	38	17	38 56	20	13	14	16	17	18	9	6
30	15	34 54	33	12	51	30	9	48	30	20	21	22	23	25		
40	8	47	26	5	44	23	2	41	40	26	27	29	30	31		
50	1	40	19	35 58	36	15	37 54	33	50	33	34	35	36	38		

TABLE 24.

Correction of the Moon's Apparent Altitude for Parallax and Refraction.

[Barometer 30 inches.—Fahrenheit's Thermometer 50°.]

Moon's app. alt.	Horizontal parallax.								Seconds of parallax.	Correction for seconds of parallax.—Add.					Corr. for minutes of alt.
	54′	55′	56′	57′	58′	59′	60′	61′		0″	2″	4″	6″	8″	
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″	″	″	″	″	″	
50 0	33 54	34 33	35 11	35 50	36 29	37 8	37 46	38 25	0	0	1	3	4	5	
10	47	26	4	43	21	0	38	17	10	6	8	9	10	12	
20	40	19	34 57	36	14	36 53	31	9	20	13	14	15	17	18	
30	33	11	49	28	6	45	23	1	30	19	20	22	23	24	
40	26	4	42	20	35 58	37	15	37 53	40	26	27	28	29	31	
50	19	33 57	35	13	51	29	7	45	50	32	33	35	36	37	Sub.
51 0	33 12	33 50	34 28	35 6	35 44	36 22	36 59	37 37	0	0	1	3	4	5	1′ 1″
10	5	43	21	34 58	36	14	51	29	10	6	8	9	10	11	2 1
20	32 58	36	13	50	28	6	43	21	20	13	14	15	16	18	3 2
30	51	29	6	43	21	35 58	36	13	30	19	20	21	23	24	4 3
40	44	22	33 59	36	14	50	28	5	40	25	26	28	29	30	5 4
50	37	14	51	28	6	42	20	36 57	50	31	33	34	35	36	6 4
52 0	32 30	33 7	33 44	34 21	34 58	35 35	36 12	36 49	0	0	1	2	4	5	7 5
10	23	0	36	13	50	27	4	41	10	6	7	9	10	11	8 6
20	15	32 52	29	6	43	19	35 56	33	20	12	13	15	16	17	9 6
30	8	45	21	33 58	35	11	48	24	30	18	20	21	22	23	
40	1	38	14	50	27	3	40	16	40	24	26	27	28	29	
50	31 54	31	7	43	19	34 55	32	8	50	31	32	33	34	35	
53 0	31 47	32 23	32 59	33 35	34 11	34 47	35 24	36 0	0	0	1	2	4	5	
10	39	15	51	27	3	39	15	35 51	10	6	7	8	10	11	
20	32	8	44	20	33 56	31	7	43	20	12	13	14	16	17	
30	25	0	36	12	48	23	34 59	35	30	18	19	20	22	23	
40	17	31 53	28	4	40	15	51	27	40	24	25	26	28	29	
50	10	46	21	32 57	32	7	43	19	50	30	31	32	34	35	
54 0	31 3	31 38	32 13	32 49	33 24	33 59	34 35	35 10	0	0	1	2	4	5	
10	30 55	30	5	41	16	51	26	1	10	6	7	8	9	11	
20	48	22	31 57	33	8	43	18	34 53	20	12	13	14	15	16	
30	40	15	49	25	0	35	10	45	30	18	19	20	21	22	
40	33	8	42	17	32 52	27	1	37	40	23	25	26	27	28	
50	26	0	35	9	44	19	33 53	28	50	29	30	32	33	34	
55 0	30 18	30 52	31 27	32 1	32 36	33 10	33 45	34 19	0	0	1	2	3	5	
10	10	45	19	31 53	28	2	36	11	10	6	7	8	9	10	
20	3	38	12	46	20	32 54	28	3	20	11	13	14	15	16	
30	29 55	30	4	38	12	46	20	33 54	30	17	18	19	20	22	
40	48	22	30 56	30	4	37	11	45	40	23	24	25	26	27	
50	40	14	48	22	31 55	29	3	37	50	28	30	31	32	33	
56 0	29 33	30 7	30 40	31 14	31 47	32 21	32 55	33 28	0	0	1	2	3	4	
10	25	29 59	32	6	39	13	46	20	10	6	7	8	9	10	
20	18	51	24	30 58	31	4	37	11	20	11	12	13	14	16	
30	10	43	16	50	23	31 56	29	2	30	17	18	19	20	21	1 1
40	3	36	9	42	15	48	21	32 54	40	22	23	24	25	27	2 2
50	28 55	28	1	34	7	40	12	45	50	28	29	30	31	32	3 2
57 0	28 47	29 20	29 53	30 25	30 58	31 31	32 3	32 36	0	0	1	2	3	4	4 3
10	39	12	45	17	50	22	31 55	27	10	5	6	7	9	10	5 4
20	32	5	37	9	42	14	47	19	20	11	12	13	14	15	6 5
30	24	28 57	29	1	33	6	38	10	30	16	17	18	19	21	7 5
40	17	49	21	29 53	25	30 57	29	1	40	22	23	24	25	26	8 6
50	9	41	13	45	17	49	21	31 52	50	27	28	29	30	31	9 7
58 0	28 1	28 33	29 5	29 37	30 9	30 41	31 12	31 44	0	0	1	2	3	4	
10	27 53	25	28 57	28	0	32	4	35	10	5	6	7	8	9	
20	45	17	49	20	29 52	23	30 55	26	20	10	12	13	14	15	
30	38	9	41	12	44	15	46	17	30	16	17	18	19	20	
40	30	1	33	4	35	6	38	9	40	21	22	23	24	25	
50	22	27 53	24	28 55	27	29 58	29	0	50	26	27	28	29	30	
59 0	27 14	27 45	28 16	28 47	29 18	29 49	30 20	30 51	0	0	1	2	3	4	
10	6	37	7	38	9	40	11	42	10	5	6	7	8	9	
20	26 58	29	27 59	30	1	31	2	33	20	10	11	12	13	14	
30	51	21	51	22	28 53	23	29 54	24	30	15	16	17	18	19	
40	43	13	43	14	44	14	45	15	40	20	21	22	23	24	
50	35	5	35	5	36	6	36	6	50	25	26	27	29	30	

TABLE 24.

Correction of the Moon's Apparent Altitude for Parallax and Refraction.

[Barometer 30 inches.—Fahrenheit's Thermometer 50°.]

Moon's app. alt.	Horizontal parallax.								Seconds of parallax.	Correction for seconds of parallax.—Add.					Corr. for minutes of alt.
	54'	55'	56'	57'	58'	59'	60'	61'		0"	2"	4"	6"	8"	
° '	' "	' "	' "	' "	' "	' "	' "	' "	"	"	"	"	"	"	
60 0	26 26	26 57	27 27	27 57	28 27	28 57	29 27	29 57	0	0	1	2	3	4	
10	19	49	19	49	19	49	18	48	10	5	6	7	8	9	
20	11	41	11	40	10	40	9	39	20	10	11	12	13	14	
30	3	32	2	31	1	31	0	30	30	15	16	17	18	19	
40	25 55	24	26 53	23	27 53	22	28 51	21	40	20	21	22	23	24	
50	47	16	45	14	44	13	42	12	50	25	26	27	28	29	
61 0	25 39	26 8	26 37	27 6	27 36	28 5	28 34	29 3	0	0	1	2	3	4	
10	31	0	29	26 58	27	27 56	25	28 54	10	5	6	7	8	9	
20	23	25 52	20	49	18	47	16	45	20	10	11	12	12	13	
30	15	43	12	40	10	38	7	35	30	14	15	16	17	18	
40	7	35	4	32	1	29	27 58	26	40	19	20	21	22	23	
50	24 59	27	25 55	24	26 52	20	49	17	50	24	25	26	27	28	
62 0	24 50	25 19	25 47	26 15	26 43	27 11	27 40	28 8	0	0	1	2	3	4	
10	42	10	38	6	34	2	30	27 58	10	5	6	6	7	8	
20	34	2	29	25 57	25	26 53	21	49	20	9	10	11	12	12	
30	26	24 54	21	49	17	45	12	40	30	14	15	16	17	18	
40	18	46	13	41	8	36	3	31	40	19	19	20	21	22	
50	10	37	4	32	25 59	27	26 54	21	50	23	24	25	26	27	
63 0	24 2	24 29	24 56	25 23	25 51	26 18	26 45	27 12	0	0	1	2	3	4	
10	23 54	21	48	15	42	9	36	3	10	4	5	6	7	8	
20	46	13	39	6	33	0	27	26 54	20	9	10	11	12	13	
30	37	4	31	24 58	24	25 51	18	45	30	13	14	15	16	17	
40	29	23 55	22	49	15	42	8	35	40	18	19	20	21	22	
50	20	47	13	40	6	33	25 59	26	50	22	23	24	25	26	
64 0	23 12	23 39	24 5	24 32	24 58	25 24	25 50	26 17	0	0	1	2	3	3	
10	4	31	23 57	23	49	15	41	8	10	4	5	6	7	8	
20	22 56	22	48	14	40	6	32	25 58	20	9	10	10	11	12	
30	47	13	39	5	31	24 57	22	48	30	13	14	15	16	16	
40	39	5	30	23 56	22	48	13	39	40	17	18	19	20	21	
50	31	22 57	22	48	13	39	4	30	50	22	23	23	24	25	
65 0	22 23	22 48	23 13	23 39	24 4	24 30	24 55	25 21	0	0	1	2	2	3	Sub.
10	14	40	5	30	23 55	20	46	11	10	4	5	6	7	7	1' 1"
20	6	31	22 56	21	46	11	36	1	20	8	9	10	11	12	2 2
30	21 58	23	48	13	37	2	27	24 52	30	13	13	14	15	16	3 3
40	49	14	39	4	28	23 53	18	43	40	17	18	18	19	20	4 4
50	41	6	30	22 55	19	44	8	33	50	21	22	23	23	24	5 5
66 0	21 32	21 57	22 21	22 46	23 10	23 35	23 59	24 23	0	0	1	2	2	3	6 5
10	24	48	12	37	1	25	49	14	10	4	5	6	7	7	7 6
20	15	39	3	28	22 52	15	40	4	20	8	9	10	11	11	8 7
30	7	31	21 55	19	43	6	31	23 55	30	12	13	14	15	16	9 8
40	20 59	22	46	10	34	22 57	21	45	40	16	17	18	19	20	
50	50	14	37	1	25	48	12	36	50	20	21	22	23	24	
67 0	20 41	21 5	21 28	21 52	22 15	22 39	23 2	23 26	0	0	1	2	2	3	
10	33	20 56	19	43	6	29	22 52	16	10	4	5	5	6	7	
20	25	48	11	34	21 57	20	43	7	20	8	8	9	10	11	
30	16	39	2	25	48	11	34	22 57	30	12	12	13	14	15	
40	8	30	20 53	16	39	2	24	47	40	15	16	17	18	18	
50	19 59	21	44	7	30	21 52	15	37	50	19	20	21	22	22	
68 0	19 50	20 13	20 35	20 58	21 21	21 43	22 5	22 28	0	0	1	1	2	3	
10	42	4	27	49	12	34	21 56	19	10	4	4	5	6	7	
20	33	19 56	18	40	2	24	47	9	20	7	8	9	9	10	
30	25	47	9	31	20 53	15	37	21 59	30	11	12	13	13	14	
40	16	38	0	22	44	5	27	49	40	15	16	16	17	18	
50	7	29	19 51	13	34	20 56	17	39	50	18	19	20	21	21	
69 0	18 59	19 21	19 42	20 4	20 25	20 47	21 8	21 30	0	0	1	1	2	3	
10	50	12	33	19 55	16	37	20 59	20	10	4	4	5	6	6	
20	42	3	24	45	7	28	49	10	20	7	8	8	9	10	
30	33	18 54	15	36	19 57	18	39	0	30	11	11	12	13	13	
40	24	45	6	27	48	9	29	20 50	40	14	15	15	16	17	
50	16	37	18 57	18	39	0	20	41	50	18	18	19	20	20	

TABLE 24.

Correction of the Moon's Apparent Altitude for Parallax and Refraction.

[Barometer 30 inches.—Fahrenheit's Thermometer 50°.]

Moon's app. alt.	Horizontal parallax.								Seconds of parallax.	Correction for seconds of parallax.—Add.					Corr. for
	54′	55′	56′	57′	58′	59′	60′	61′		0″	2″	4″	6″	8″	
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″	″	″	″	″	″	
70 0	18 7	18 28	18 48	19 9	19 30	19 50	20 11	20 31	0	0	1	1	2	3	
10	17 58	19	39	0	20	41	1	21	10	3	4	5	5	6	
20	50	10	30	18 50	11	31	19 51	11	20	7	7	8	9	9	
30	41	1	21	41	1	21	41	1	30	10	11	11	12	13	
40	32	17 53	12	32	18 52	12	32	19 52	40	13	14	15	15	16	
50	24	44	3	23	43	3	22	42	50	17	17	18	19	19	
71 0	17 15	17 35	17 54	18 14	18 34	18 53	19 12	19 32	0	0	1	1	2	3	
10	6	26	45	5	24	43	3	22	10	3	4	4	5	6	
20	16 57	17	36	17 55	14	33	18 53	12	20	6	7	8	8	9	
30	48	8	27	46	5	24	43	2	30	10	10	11	12	12	
40	40	16 59	18	37	17 56	15	34	18 52	40	13	13	14	15	15	
50	31	50	9	28	47	5	24	42	50	16	17	17	18	19	
72 0	16 22	16 41	17 0	17 18	17 37	17 55	18 14	18 32	0	0	1	1	2	2	
10	13	32	16 50	9	27	46	4	22	10	3	4	4	5	5	
20	5	23	41	16 59	18	36	17 54	12	20	6	7	7	8	8	
30	15 57	14	32	50	9	27	45	3	30	9	10	10	11	11	
40	48	5	23	41	16 59	17	35	17 53	40	12	13	13	14	14	
50	39	15 56	14	32	50	7	25	43	50	15	16	16	17	18	
73 0	15 30	15 47	16 5	16 22	16 40	16 58	17 15	17 33	0	0	1	1	2	2	
10	21	38	15 56	13	30	48	5	23	10	3	3	4	5	5	
20	12	29	47	4	21	39	16 56	13	20	6	6	7	7	8	
30	3	20	37	15 55	12	29	46	3	30	9	9	10	10	11	
40	14 54	11	28	45	2	19	36	16 53	40	11	12	13	13	14	
50	45	2	19	35	15 52	9	26	42	50	14	15	15	16	17	
74 0	14 36	14 53	15 9	15 26	15 42	15 59	16 16	16 32	0	0	1	1	2	2	Sub.
10	28	44	0	17	33	49	6	22	10	3	3	4	4	5	1′ 1″
20	19	35	14 51	8	24	40	15 56	12	20	5	6	6	7	8	2 2
30	10	26	42	14 58	14	30	46	2	30	8	9	9	10	11	3 3
40	1	17	33	49	5	20	36	15 52	40	11	11	12	12	13	4 4
50	13 52	8	23	39	14 55	10	26	42	50	13	14	14	15	16	5 5
75 0	13 43	13 59	14 14	14 29	14 45	15 1	15 16	15 32	0	0	1	1	2	2	6 6
10	34	50	5	20	36	14 52	7	22	10	3	3	4	4	5	7 7
20	25	41	13 56	11	27	42	14 57	12	20	5	6	6	7	7	8 8
30	16	32	46	1	17	32	47	2	30	8	8	9	9	10	9 9
40	7	22	37	13 52	7	22	37	14 51	40	10	11	11	12	12	
50	12 58	13	28	42	13 57	12	27	41	50	13	13	14	14	15	
76 0	12 49	13 4	13 18	13 33	13 47	14 2	14 17	14 31	0	0	0	1	1	2	
10	41	12 55	9	24	38	13 53	7	21	10	2	3	3	4	4	
20	32	46	0	14	28	43	13 57	11	20	5	5	6	6	7	
30	23	37	12 51	5	19	33	47	1	30	7	8	8	8	9	
40	14	27	41	12 55	9	23	36	13 50	40	9	10	10	11	11	
50	5	18	32	45	12 59	13	26	40	50	12	12	13	13	14	
77 0	11 56	12 9	12 22	12 36	12 49	13 3	13 16	13 30	0	0	0	1	1	2	
10	47	0	13	27	40	12 53	7	20	10	2	3	3	4	4	
20	38	11 51	4	17	30	43	12 57	10	20	4	5	5	6	6	
30	29	42	11 55	8	21	33	47	0	30	7	7	7	8	8	
40	19	32	45	11 58	11	23	36	12 49	40	9	9	9	10	10	
50	10	23	35	48	1	13	26	39	50	11	11	12	12	13	
78 0	11 1	11 14	11 26	11 39	11 52	12 4	12 16	12 29	0	0	0	1	1	2	
10	10 52	5	17	30	42	11 54	6	19	10	2	2	3	3	4	
20	43	10 55	8	20	32	44	11 56	8	20	4	4	5	5	6	
30	34	46	10 58	10	22	34	46	11 58	30	6	6	7	7	8	
40	25	37	48	0	12	24	36	48	40	8	8	9	9	10	
50	16	28	39	10 51	3	15	26	38	50	10	10	11	11	12	
79 0	10 7	10 19	10 30	10 42	10 53	11 5	11 16	11 28	0	0	0	1	1	1	
10	9 58	9	21	32	43	10 55	6	17	10	2	2	3	3	3	
20	49	0	11	22	33	44	10 56	7	20	4	4	4	5	5	
30	40	9 50	1	12	23	34	45	10 56	30	6	6	6	7	7	
40	31	41	9 52	3	13	24	35	46	40	7	8	8	8	9	
50	22	32	43	9 54	4	15	25	36	50	9	10	10	10	11	

TABLE 24.

Correction of the Moon's Apparent Altitude for Parallax and Refraction.

[Barometer 30 inches.—Fahrenheit's Thermometer 50°.]

Moon's app. alt.	Horizontal parallax.								Seconds of parallax.	Correction for seconds of parallax.—Add.					Corr. for minutes of alt.
	54′	55′	56′	57′	58′	59′	60′	61′		0″	2″	4″	6″	8″	
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″	″	″	″	″	″	
80 0	9 13	9 23	9 34	9 44	9 55	10 5	10 15	10 26	0	0	0	1	1	1	
10	3	14	24	34	45	9 55	5	15	10	2	2	2	3	3	
20	8 54	4	14	24	35	45	9 55	5	20	3	4	4	4	5	
30	45	8 55	5	15	25	35	45	9 54	30	5	5	6	6	6	
40	36	46	8 55	5	15	25	35	44	40	7	7	7	8	8	
50	27	37	46	8 56	6	15	25	34	50	8	9	9	9	10	
81 0	8 18	8 27	8 37	8 46	8 56	9 5	9 14	9 24	0	0	0	1	1	1	
10	9	18	27	36	46	8 55	4	13	10	1	2	2	2	3	
20	7 59	8	17	26	36	45	8 54	3	20	3	3	4	4	4	
30	50	7 59	8	17	26	35	44	8 52	30	4	5	5	5	6	
40	41	50	7 59	8	17	25	34	42	40	6	6	6	7	7	
50	32	41	49	7 58	7	15	24	32	50	7	8	8	8	9	
82 0	7 23	7 31	7 40	7 48	7 57	8 5	8 13	8 22	0	0	0	1	1	1	
10	14	22	30	38	47	7 55	3	11	10	1	2	2	2	2	
20	4	12	20	28	37	45	7 52	0	20	3	3	3	3	4	
30	6 55	3	11	19	27	35	42	7 50	30	4	4	5	5	5	
40	46	6 54	2	10	17	25	32	40	40	5	6	6	6	6	
50	37	45	6 52	0	7	15	22	30	50	7	7	7	7	8	
83 0	6 28	6 35	6 43	6 50	6 57	7 5	7 12	7 20	0	0	0	0	1	1	Sub.
10	19	26	33	40	47	6 54	2	9	10	1	1	2	2	2	1′ 1″
20	9	16	23	30	37	44	6 51	6 58	20	2	3	3	3	3	2 2
30	0	7	13	20	27	34	41	48	30	3	4	4	4	4	3 3
40	5 51	5 58	4	11	18	24	31	38	40	5	5	5	5	6	4 4
50	42	49	5 55	1	8	14	21	27	50	6	6	6	6	7	5 5
84 0	5 33	5 39	5 45	5 52	5 58	6 4	6 10	6 17	0	0	0	0	1	1	6 6
10	23	30	36	42	48	5 54	0	6	10	1	1	1	2	2	7 7
20	14	20	26	32	38	44	5 50	5 55	20	2	2	2	3	3	8 8
30	5	10	16	22	28	34	39	45	30	3	3	3	3	4	9 9
40	4 56	1	7	13	18	24	29	35	40	4	4	4	4	5	
50	47	4 52	4 58	3	8	14	19	25	50	5	5	5	5	6	
85 0	4 37	4 43	4 48	4 53	4 58	5 4	5 9	5 14	0	0	0	0	0	1	
10	28	33	38	43	48	4 53	4 58	3	10	1	1	1	1	1	
20	18	24	28	33	38	43	48	4 53	20	2	2	2	2	2	
30	9	14	19	23	28	33	38	43	30	2	3	3	3	3	
40	0	5	10	14	19	23	28	33	40	3	3	4	4	4	
50	3 51	3 56	0	5	9	13	18	22	50	4	4	4	5	5	
86 0	3 42	3 46	3 50	3 55	3 59	4 3	4 7	4 11	0	0	0	0	0	1	
10	33	37	41	45	49	3 53	3 57	1	10	1	1	1	1	1	
20	23	27	31	35	39	43	46	3 50	20	1	1	2	2	2	
30	14	18	21	25	29	33	36	40	30	2	2	2	2	2	
40	5	9	12	16	19	23	26	30	40	3	3	3	3	3	
50	2 56	2 59	3	6	9	13	16	19	50	3	3	3	4	4	
87 0	2 47	2 50	2 53	2 56	2 59	3 2	3 5	3 9	0	0	0	0	0	0	
10	37	40	43	46	49	2 52	2 55	2 58	10	0	1	1	1	1	
20	28	31	33	36	39	42	45	47	20	1	1	1	1	1	
30	19	21	24	26	29	32	34	37	30	1	1	2	2	2	
40	10	12	15	17	19	22	24	27	40	2	2	2	2	2	
50	1	3	5	7	9	12	14	16	50	2	2	2	3	3	
88 0	1 51	1 53	1 55	1 57	1 59	2 2	2 4	2 6	0	0	0	0	0	0	
10	42	43	45	47	49	1 51	1 53	1 55	10	0	0	0	0	0	
20	32	34	36	38	39	41	43	44	20	1	1	1	1	1	
30	23	25	26	28	29	31	32	34	30	1	1	1	1	1	
40	14	15	16	19	20	21	22	24	40	1	1	1	1	1	
50	5	6	7	9	10	11	12	13	50	1	1	1	2	2	
89 0	0 56	0 57	0 58	0 59	1 0	1 1	1 2	1 3	0	0	0	0	0	0	
10	46	47	48	49	0 50	0 51	0 51	0 52	10	0	0	0	0	0	
20	37	37	38	39	40	40	41	42	20	0	0	0	0	0	
30	28	28	28	29	30	30	31	31	30	0	0	0	0	0	
40	19	19	19	19	20	20	21	21	40	0	0	0	0	0	
50	9	10	10	10	10	10	10	10	50	1	1	1	1	1	

TABLE 25.

Table showing the variation of the altitude of an object arising from a change of 100 seconds in the declination. Unmarked quantities in the Table are positive. If the change move the body toward the elevated pole, apply the correction to the altitude with the signs in the Table; otherwise, change the signs.

Declination.	Altitude.	Latitude of same name as declination.								Latitude of different name from declination.							Altitude.	Declination.
		70°	60°	50°	40°	30°	20°	10°	0°	10°	20°	30°	40°	50°	60°	70°		
°	°	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	°	°
0	0	94	87	76	64	50	34	17	0	17	34	50	64	76	87	94	0	0
	10	95	88	78	65	51	35	18	0	18	35	51	65	78	88	95	10	
	20	100	92	82	68	53	36	18	0	18	36	53	68	82	92	100	20	
	30		100	88	74	57	39	20	0	20	39	57	74	88	100		30	
	40			100	84	65	45	22	0	22	45	65	84	100			40	
	50				100	78	53	27	0	27	53	78	100				50	
	60					100	68	35	0	35	68	100					60	
	70						100	51	0	51	100						70	
2	0	94	87	77	64	50	34	17	0	17	34	50	64	77	87	94	0	2
	10	95	87	77	65	50	34	17	−1	18	35	51	66	78	88	96	10	
	20	99	91	81	67	52	35	17	−1	19	37	54	69	83	93	101	20	
	30	107	98	87	73	56	38	18	−2	22	41	59	76	90	102		30	
	40		111	98	82	63	42	20	−2	25	47	68	86	102			40	
	50			116	97	74	50	24	−3	30	57	81	103				50	
	60				124	95	64	30	−5	40	73	103					60	
	70					139	92	43	−8	59	108						70	
4	0	94	87	77	64	50	34	17	0	17	34	50	64	77	87	94	0	4
	10	94	87	77	64	50	34	16	−1	19	36	52	67	79	89	97	10	
	20	98	90	79	66	51	34	16	−3	21	39	56	71	84	95	103	20	
	30	105	96	85	70	54	36	16	−4	24	44	62	78	93	104		30	
	40		107	94	78	59	39	17	−6	29	51	71	90	106			40	
	50			111	92	70	45	19	−8	35	62	86	109				50	
	60				117	88	56	23	−12	47	81	112					60	
	70					127	81	32	−19	70	119						70	
6	0	94	87	77	65	50	34	17	0	17	34	50	65	77	87	94	0	6
	10	94	87	76	64	49	33	16	−2	20	37	53	67	80	90	98	10	
	20	97	89	78	65	50	33	15	−4	22	40	57	73	86	96	104	20	
	30	103	94	83	69	52	34	14	−6	26	46	64	81	95	107		30	
	40		105	92	76	57	36	14	−9	32	54	74	93	109			40	
	50			107	88	66	41	15	−13	40	66	91	113				50	
	60				111	82	51	17	−18	53	87	119					60	
	70					118	72	22	−29	80	129						70	
8	0	95	87	77	65	50	35	18	0	18	35	50	65	77	87	95	0	8
	10	94	86	76	63	49	33	15	−3	20	38	54	68	81	91	99	10	
	20	96	88	77	64	49	32	14	−5	24	40	59	74	87	98	106	20	
	30	101	93	81	67	50	32	12	−8	28	48	66	83	97	109		30	
	40		102	89	73	54	33	11	−12	35	57	78	97	113			40	
	50			104	84	62	37	11	−17	44	70	95	118				50	
	60				105	77	45	11	−24	59	93	125					60	
	70					109	62	13	−39	90	140						70	
10	0	95	88	78	65	51	35	18	0	18	35	51	65	78	88	95	0	10
	10	94	86	75	63	48	32	15	−3	21	38	55	69	82	92	100	10	
	20	95	87	76	63	48	31	12	−6	25	43	60	76	89	100		20	
	30	100	91	80	65	49	30	10	−10	30	50	69	86	100			30	
	40		100	87	70	51	31	8	−15	38	60	81	100				40	
	50			100	81	58	33	6	−21	48	75	100					50	
	60				100	71	39	5	−31	66	100						60	
	70					100	53	3	−48	100							70	
12	0	96	89	78	66	51	35	18	0	18	35	51	66	78	89	96	0	12
	10	94	86	76	63	48	32	14	−4	22	39	56	70	83	94	101	10	
	20	94	86	76	62	47	29	11	−8	27	45	62	78	91	102		20	
	30	99	90	78	64	47	28	8	−12	33	53	71	88	103			30	
	40	108	98	84	68	49	28	5	−18	41	63	85	104				40	
	50		112	97	77	54	29	2	−25	53	80	105					50	
	60			120	95	65	33	−1	−37	72	107						60	
	70				134	91	44	−6	−58	110							70	
Declination.	Altitude.	70°	60°	50°	40°	30°	20°	10°	0°	10°	20°	30°	40°	50°	60°	70°	Altitude.	Declination.
		Latitude of same name as declination.								Latitude of different name from declination.								

TABLE 25.

Table showing the variation of the altitude of an object arising from a change of 100 seconds in the declination. Unmarked quantities in the Table are positive. If the change move the body toward the elevated pole, apply the correction to the altitude with the signs in the Table; otherwise, change the signs.

Declination.	Altitude.	Latitude of same name as declination.								Latitude of different name from declination.							Altitude.	Declination.
		70°	60°	50°	40°	30°	20°	10°	0°	10°	20°	30°	40°	50°	60°	70°		
°	°	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	°	°
14	0	97	89	79	66	52	35	18	0	18	35	52	66	79	89	97	0	14
	10	94	86	76	63	48	31	14	− 4	23	40	57	72	85	95	103	10	
	20	94	86	75	61	46	27	10	− 9	28	45	64	80	93	104		20	
	30	97	89	77	62	45	26	6	− 14	35	55	74	91	106			30	
	40	106	96	82	66	46	25	2	− 21	44	67	88	107				40	
	50		109	93	73	50	25	− 2	− 30	58	85	110					50	
	60			115	89	60	27	− 7	− 43	79	114						60	
	70				125	82	35	−16	− 69	121							70	
16	0	98	90	80	67	52	36	18	0	18	36	52	67	80	90	98	0	16
	10	94	86	76	63	48	31	13	− 5	23	41	58	73	86	97	104	10	
	20	94	85	74	61	45	27	9	− 10	30	48	66	82	95	106		20	
	30	96	87	75	61	44	25	4	− 17	37	58	77	94	109			30	
	40	104	94	80	63	44	22	0	− 24	48	70	92	111				40	
	50		106	90	70	47	21	− 6	− 34	62	90	115					50	
	60			110	84	54	21	−14	− 50	86	121						60	
	70				117	73	25	−26	− 79	132							70	
18	0	99	91	81	68	53	36	18	0	18	36	53	68	81	91	99	0	18
	10	95	87	76	63	48	31	13	− 6	24	42	59	74	88	98	106	10	
	20	93	85	74	60	44	26	8	− 12	31	50	68	84	98	109		20	
	30	95	86	74	59	42	23	2	− 19	40	60	79	97	112			30	
	40	102	92	78	61	41	20	− 3	− 27	51	74	96	116				40	
	50		103	87	66	43	17	−10	− 39	67	95	121					50	
	60			105	79	49	16	−20	− 56	93	128						60	
	70				108	64	16	−36	− 89	143							70	
20	0	100	92	82	68	53	36	18	0	18	36	53	68	82	92	100	0	20
	10	95	87	76	63	48	31	12	− 6	25	43	60	76	89	100		10	
	20	93	85	74	60	43	25	6	− 13	33	52	70	86	100			20	
	30	94	85	73	58	40	21	0	− 21	42	63	82	100				30	
	40	100	90	76	59	39	17	− 6	− 31	55	78	100					40	
	50		100	83	63	39	13	−15	− 43	72	100						50	
	60			100	74	43	10	−26	− 63	100							60	
	70				100	56	6	−46	−100								70	
22	0		93	83	69	54	37	19	0	19	37	54	69	83	93	101	0	22
	10	96	88	77	63	48	30	12	− 7	26	45	62	78	91	102		10	
	20	93	85	73	59	43	25	5	− 15	35	54	72	88	103			20	
	30	94	85	72	57	39	19	− 2	− 23	45	66	86	103				30	
	40	98	88	74	57	36	14	− 9	− 34	58	82	104					40	
	50	110	97	80	60	36	9	−19	− 48	77	106						50	
	60		117	95	68	38	4	−33	− 70	107							60	
	70			131	92	47	− 3	−56	−111								70	
24	0		95	84	70	55	37	19	0	19	37	55	70	84	95	103	0	24
	10	97	88	77	64	48	30	11	− 8	27	46	63	79	93	104		10	
	20	93	85	73	59	42	24	4	− 16	36	56	74	91	105			20	
	30	93	84	71	56	38	18	− 4	− 26	48	69	89	107				30	
	40	97	86	72	54	34	12	−12	− 37	62	86	109					40	
	50	107	93	77	56	32	5	−23	− 53	83	111						50	
	60		112	91	64	32	− 2	−39	− 77	115							60	
	70			123	83	38	−13	−67	−122								70	
26	0		96	85	72	56	38	19	0	19	38	56	72	85	96	105	0	26
	10	98	89	78	64	48	30	11	− 9	28	47	65	81	95	106		10	
	20	95	85	73	59	41	23	3	− 18	38	58	77	94	108			20	
	30	93	83	70	54	36	16	− 6	− 28	50	72	92	111				30	
	40	96	85	70	52	32	9	−16	− 41	66	91	114					40	
	50	105	92	74	53	28	1	−28	− 58	88	117						50	
	60		108	86	58	27	− 8	−46	− 84	123							60	
	70			115	75	29	−23	−78	−134								70	
Declination.	Altitude.	70°	60°	50°	40°	30°	20°	10°	0°	10°	20°	30°	40°	50°	60°	70°	Altitude.	Declination.
		Latitude of same name as declination.								Latitude of different name from declination.								

TABLE 26.

Variation of Altitude in one minute from meridian passage.

Latitude.	Declination of the same name as the latitude; upper transit; reduction additive.												Latitude.
	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	
°	″	″	″	″	″	″	″	″	″	″	″	″	°
0					28.1	22.4	18.7	16.0	14.0	12.4	11.1	10.1	0
1						28.0	22.4	18.6	16.0	13.9	12.4	11.1	1
2							28.0	22.3	18.6	15.9	13.9	12.3	2
3								27.9	22.3	18.5	15.8	13.8	3
4	28.1								27.8	22.2	18.5	15.8	4
5	22.4	28.0								27.7	22.1	18.4	5
6	18.7	22.4	28.0								27.6	22.0	6
7	16.0	18.6	22.3	27.9								27.4	7
8	14.0	16.0	18.6	22.3	27.8								8
9	12.4	13.9	15.9	18.5	22.2	27.7							9
10	11.1	12.4	13.9	15.8	18.5	22.1	27.6						10
11	10.1	11.1	12.3	13.8	15.8	18.4	22.0	27.4					11
12	9.2	10.1	11.1	12.3	13.8	15.7	18.3	21.9	27.3				12
13	8.5	9.2	10.0	11.0	12.2	13.7	15.6	18.2	21.7	27.1			13
14	7.9	8.5	9.2	10.0	10.9	12.1	13.6	15.5	18.0	21.6	26.9		14
15	7.3	7.8	8.4	9.1	9.9	10.9	12.1	13.5	15.4	17.9	21.4	26.7	15
16	6.8	7.3	7.8	8.4	9.1	9.8	10.8	12.0	13.4	15.3	17.8	21.3	16
17	6.4	6.8	7.2	7.8	8.3	9.0	9.8	10.7	11.9	13.3	15.2	17.6	17
18	6.0	6.4	6.8	7.2	7.7	8.3	8.9	9.7	10.6	11.8	13.2	15.0	18
19	5.7	6.0	6.3	6.7	7.2	7.6	8.2	8.9	9.6	10.6	11.7	13.1	19
20	5.4	5.7	6.0	6.3	6.7	7.1	7.6	8.1	8.8	9.5	10.5	11.6	20
21	5.1	5.4	5.6	5.9	6.3	6.6	7.0	7.5	8.1	8.7	9.5	10.4	21
22	4.9	5.1	5.3	5.6	5.9	6.2	6.6	7.0	7.5	8.0	8.6	9.4	22
23	4.6	4.8	5.0	5.3	5.5	5.8	6.1	6.5	6.9	7.4	7.9	8.5	23
24	4.4	4.6	4.8	5.0	5.2	5.5	5.8	6.1	6.4	6.8	7.3	7.8	24
25	4.2	4.4	4.6	4.7	5.0	5.2	5.4	5.7	6.0	6.4	6.8	7.2	25
26	4.0	4.2	4.3	4.5	4.7	4.9	5.1	5.4	5.7	6.0	6.3	6.7	26
27	3.9	4.0	4.1	4.3	4.5	4.7	4.9	5.1	5.3	5.6	5.9	6.2	27
28	3.7	3.8	4.0	4.1	4.3	4.4	4.6	4.8	5.0	5.3	5.5	5.8	28
29	3.5	3.7	3.8	3.9	4.1	4.2	4.4	4.6	4.7	5.0	5.2	5.5	29
30	3.4	3.5	3.6	3.7	3.9	4.0	4.2	4.3	4.5	4.7	4.9	5.1	30
31	3.3	3.4	3.5	3.6	3.7	3.8	4.0	4.1	4.3	4.4	4.6	4.8	31
32	3.1	3.2	3.3	3.4	3.5	3.7	3.8	3.9	4.1	4.2	4.4	4.6	32
33	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.9	4.0	4.2	4.3	33
34	2.9	3.0	3.1	3.2	3.2	3.3	3.4	3.6	3.7	3.8	3.9	4.1	34
35	2.8	2.9	3.0	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.9	35
36	2.7	2.8	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	36
37	2.6	2.7	2.7	2.8	2.9	2.9	3.0	3.1	3.2	3.3	3.4	3.5	37
38	2.5	2.6	2.6	2.7	2.8	2.8	2.9	3.0	3.0	3.2	3.2	3.3	38
39	2.4	2.5	2.5	2.6	2.7	2.7	2.8	2.9	2.9	3.0	3.1	3.2	39
40	2.3	2.4	2.4	2.5	2.6	2.6	2.7	2.7	2.8	2.9	3.0	3.0	40
41	2.3	2.3	2.4	2.4	2.5	2.5	2.6	2.6	2.7	2.8	2.8	2.9	41
42	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.5	2.6	2.6	2.7	2.8	42
43	2.1	2.1	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.5	2.6	2.7	43
44	2.0	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.5	44
45	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.4	2.4	45
46	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.3	2.3	46
47	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	47
48	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	48
49	1.7	1.7	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.1	49
50	1.6	1.7	1.7	1.7	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	50
51	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.8	1.8	1.8	1.9	1.9	51
52	1.5	1.6	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.8	1.8	1.8	52
53	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	53
54	1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.7	54
55	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.6	55
56	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.5	56
57	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.5	57
58	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.4	58
59	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	59
60	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	60
	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	

Declination of the same name as the latitude; upper transit; reduction additive.

TABLE 26.

Variation of Altitude in one minute from meridian passage.

Latitude.	Declination of the same name as the latitude; upper transit; reduction additive.													Latitude.
	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	24°	
°	″	″	″	″	″	″	″	″	″	″	″	″	″	°
0	9.2	8.5	7.9	7.3	6.8	6.4	6.0	5.7	5.4	5.1	4.9	4.6	4.4	0
1	10.1	9.2	8.5	7.8	7.3	6.8	6.4	6.0	5.7	5.4	5.1	4.8	4.6	1
2	11.1	10.0	9.2	8.4	7.8	7.2	6.8	6.3	6.0	5.6	5.3	5.0	4.8	2
3	12.3	11.0	10.0	9.1	8.4	7.8	7.2	6.7	6.3	5.9	5.6	5.3	5.0	3
4	13.8	12.2	10.9	9.9	9.1	8.3	7.7	7.2	6.7	6.3	5.9	5.5	5.2	4
5	15.7	13.7	12.1	10.9	9.8	9.0	8.3	7.6	7.1	6.6	6.2	5.8	5.5	5
6	18.3	15.6	13.6	12.1	10.8	9.8	8.9	8.2	7.6	7.0	6.6	6.1	5.8	6
7	21.9	18.2	15.5	13.5	12.0	10.7	9.7	8.9	8.1	7.5	7.0	6.5	6.1	7
8	27.3	21.7	18.0	15.4	13.4	11.9	10.6	9.6	8.8	8.1	7.5	6.9	6.4	8
9		27.1	21.6	17.9	15.3	13.3	11.8	10.6	9.5	8.7	8.0	7.4	6.8	9
10			26.9	21.4	17.8	15.2	13.2	11.7	10.5	9.5	8.6	7.9	7.3	10
11				26.7	21.3	17.6	15.0	13.1	11.6	10.4	9.4	8.5	7.8	11
12					26.5	21.1	17.5	14.9	13.0	11.5	10.3	9.3	8.4	12
13						26.2	20.9	17.3	14.8	12.8	11.3	10.1	9.2	13
14							26.0	20.7	17.1	14.6	12.7	11.2	10.0	14
15								25.7	20.4	16.9	14.4	12.5	11.1	15
16	26.5								25.4	20.2	16.7	14.3	12.4	16
17	21.1	26.2								25.1	20.0	16.5	14.1	17
18	17.5	20.9	26.0								24.8	19.7	16.3	18
19	14.9	17.3	20.7	25.7								24.5	19.5	19
20	13.0	14.8	17.1	20.4	25.4								24.2	20
21	11.5	12.8	14.6	16.9	20.2	25.1								21
22	10.3	11.3	12.7	14.4	16.7	20.0	24.8							22
23	9.3	10.1	11.2	12.5	14.3	16.5	19.7	24.5						23
24	8.4	9.2	10.0	11.1	12.4	14.1	16.3	19.5	24.2					24
25	7.7	8.3	9.0	9.9	10.9	12.2	13.9	16.1	19.2	23.8				25
26	7.1	7.6	8.2	8.9	9.8	10.8	12.1	13.7	15.9	18.9	23.5			26
27	6.6	7.0	7.5	8.1	8.8	9.6	10.6	11.9	13.5	15.6	18.6	23.1		27
28	6.2	6.5	7.0	7.4	8.0	8.7	9.5	10.5	11.7	13.3	15.4	18.3	22.7	28
29	5.7	6.1	6.4	6.9	7.3	7.9	8.6	9.4	10.3	11.5	13.1	15.1	18.0	29
30	5.4	5.7	6.0	6.4	6.8	7.2	7.8	8.4	9.2	10.1	11.3	12.8	14.9	30
31	5.1	5.3	5.6	5.9	6.3	6.7	7.1	7.7	8.3	9.0	10.0	11.1	12.6	31
32	4.8	5.0	5.2	5.5	5.8	6.2	6.5	7.0	7.5	8.1	8.9	9.8	10.9	32
33	4.5	4.7	4.9	5.1	5.4	5.7	6.1	6.4	6.9	7.4	8.0	8.7	9.6	33
34	4.3	4.4	4.6	4.8	5.1	5.3	5.6	5.9	6.3	6.8	7.3	7.8	8.6	34
35	4.0	4.2	4.4	4.5	4.7	5.0	5.2	5.5	5.8	6.2	6.6	7.1	7.7	35
36	3.8	4.0	4.1	4.3	4.5	4.7	4.9	5.1	5.4	5.7	6.1	6.5	7.0	36
37	3.6	3.8	3.9	4.0	4.2	4.4	4.6	4.8	5.0	5.3	5.6	6.0	6.4	37
38	3.4	3.6	3.7	3.8	4.0	4.1	4.3	4.5	4.7	4.9	5.2	5.5	5.8	38
39	3.3	3.4	3.5	3.6	3.8	3.9	4.0	4.2	4.4	4.6	4.8	5.1	5.4	39
40	3.1	3.2	3.3	3.4	3.6	3.7	3.8	4.0	4.1	4.3	4.5	4.7	5.0	40
41	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.9	4.0	4.2	4.4	4.6	41
42	2.9	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.7	3.8	4.0	4.1	4.3	42
43	2.7	2.8	2.9	3.0	3.0	3.1	3.2	3.3	3.5	3.6	3.7	3.9	4.0	43
44	2.6	2.7	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.8	44
45	2.5	2.6	2.6	2.7	2.8	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	45
46	2.4	2.4	2.5	2.6	2.6	2.7	2.8	2.8	2.9	3.0	3.1	3.2	3.3	46
47	2.3	2.3	2.4	2.4	2.5	2.6	2.6	2.7	2.8	2.9	2.9	3.0	3.1	47
48	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.6	2.6	2.7	2.8	2.9	3.0	48
49	2.1	2.1	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.6	2.6	2.7	2.8	49
50	2.0	2.0	2.1	2.1	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.6	2.6	50
51	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.3	2.3	2.4	2.4	2.5	51
52	1.8	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.3	2.4	52
53	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	53
54	1.7	1.7	1.7	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.1	2.1	54
55	1.6	1.6	1.7	1.7	1.7	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.0	55
56	1.5	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.8	1.8	1.8	1.9	1.9	56
57	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.8	1.8	57
58	1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.7	1.7	58
59	1.4	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.6	59
60	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.5	60
	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	24°	
	Declination of the same name as the latitude; upper transit; reduction additive.													

TABLE 26.

Variation of Altitude in one minute from meridian passage.

Latitude.	Declination of the same name as the latitude; upper transit; reduction additive.													Latitude.
	25°	26°	27°	28°	29°	30°	31°	32°	33°	34°	35°	36°	37°	
°	″	″	″	″	″	″	″	″	″	″	″	″	″	°
0	4.2	4.0	3.9	3.7	3.5	3.4	3.3	3.1	3.0	2.9	2.8	2.7	2.6	0
1	4.4	4.2	4.0	3.8	3.7	3.5	3.4	3.2	3.1	3.0	2.9	2.8	2.7	1
2	4.6	4.3	4.1	4.0	3.8	3.6	3.5	3.3	3.2	3.1	3.0	2.8	2.7	2
3	4.7	4.5	4.3	4.1	3.9	3.7	3.6	3.4	3.3	3.2	3.0	2.9	2.8	3
4	5.0	4.7	4.5	4.3	4.1	3.9	3.7	3.5	3.4	3.3	3.1	3.0	2.9	4
5	5.2	4.9	4.7	4.4	4.2	4.0	3.8	3.7	3.5	3.3	3.2	3.1	3.0	5
6	5.4	5.1	4.9	4.6	4.4	4.2	4.0	3.8	3.6	3.5	3.3	3.2	3.0	6
7	5.7	5.4	5.1	4.8	4.6	4.3	4.1	3.9	3.7	3.6	3.4	3.3	3.1	7
8	6.0	5.7	5.3	5.0	4.8	4.5	4.3	4.1	3.9	3.7	3.5	3.4	3.2	8
9	6.4	6.0	5.6	5.3	5.0	4.7	4.4	4.2	4.0	3.8	3.6	3.5	3.3	9
10	6.8	6.3	5.9	5.5	5.2	4.9	4.6	4.4	4.2	3.9	3.8	3.6	3.4	10
11	7.2	6.7	6.2	5.8	5.5	5.1	4.8	4.6	4.3	4.1	3.9	3.7	3.5	11
12	7.7	7.1	6.6	6.2	5.8	5.4	5.1	4.8	4.5	4.3	4.0	3.8	3.6	12
13	8.3	7.6	7.1	6.5	6.1	5.7	5.3	5.0	4.7	4.4	4.2	4.0	3.8	13
14	9.1	8.2	7.6	7.0	6.4	6.0	5.6	5.2	4.9	4.6	4.4	4.1	3.9	14
15	9.9	8.9	8.1	7.4	6.9	6.4	5.9	5.5	5.2	4.8	4.5	4.3	4.0	15
16	10.9	9.8	8.8	8.0	7.3	6.8	6.3	5.8	5.4	5.1	4.8	4.5	4.2	16
17	12.2	10.8	9.6	8.7	7.9	7.2	6.7	6.2	5.7	5.3	5.0	4.7	4.4	17
18	13.9	12.1	10.6	9.5	8.6	7.8	7.1	6.6	6.1	5.6	5.2	4.9	4.6	18
19	16.1	13.7	11.9	10.5	9.4	8.4	7.7	7.0	6.4	6.0	5.5	5.1	4.8	19
20	19.2	15.9	13.5	11.7	10.3	9.2	8.3	7.5	6.9	6.3	5.8	5.4	5.0	20
21	23.8	18.9	15.6	13.3	11.5	10.2	9.1	8.2	7.4	6.8	6.2	5.7	5.3	21
22		23.5	18.6	15.4	13.1	11.3	10.0	8.9	8.0	7.3	6.6	6.1	5.6	22
23			23.1	18.3	15.1	12.8	11.1	9.8	8.7	7.9	7.1	6.5	6.0	23
24				22.7	18.0	14.9	12.6	10.9	9.6	8.6	7.7	7.0	6.4	24
25					22.3	17.7	14.6	12.4	10.7	9.4	8.4	7.5	6.8	25
26						21.9	17.4	14.3	12.1	10.5	9.2	8.2	7.4	26
27							21.5	17.0	14.0	11.9	10.3	9.1	8.1	27
28								21.1	16.7	13.8	11.7	10.1	8.9	28
29	22.3								20.6	16.3	13.5	11.4	9.9	29
30	17.7	21.9								20.2	16.0	13.2	11.1	30
31	14.6	17.4	21.5								19.8	15.6	12.9	31
32	12.4	14.3	17.0	21.1								19.3	15.3	32
33	10.7	12.1	14.0	16.7	20.6								18.9	33
34	9.4	10.5	11.9	13.8	16.3	20.2								34
35	8.4	9.2	10.3	11.7	13.5	16.0	19.8							35
36	7.5	8.2	9.1	10.1	11.4	13.2	15.6	19.3						36
37	6.8	7.4	8.1	8.9	9.9	11.1	12.9	15.3	18.9					37
38	6.2	6.7	7.2	7.9	8.7	9.6	10.9	12.6	14.9	18.4				38
39	5.7	6.1	6.5	7.1	7.7	8.5	9.4	10.6	12.2	14.5	17.9			39
40	5.3	5.6	6.0	6.4	6.9	7.5	8.2	9.2	10.4	11.9	14.1	17.4		40
41	4.9	5.2	5.5	5.8	6.2	6.7	7.3	8.0	8.9	10.1	11.6	13.8	17.0	41
42	4.5	4.8	5.0	5.3	5.7	6.1	6.6	7.1	7.8	8.7	9.8	11.3	13.4	42
43	4.2	4.4	4.6	4.9	5.2	5.5	5.9	6.4	6.9	7.6	8.5	9.5	11.0	43
44	3.9	4.1	4.3	4.5	4.8	5.1	5.4	5.8	6.2	6.7	7.4	8.2	9.3	44
45	3.7	3.8	4.0	4.2	4.4	4.7	4.9	5.2	5.6	6.0	6.6	7.2	8.0	45
46	3.5	3.6	3.7	3.9	4.1	4.3	4.5	4.8	5.1	5.4	5.9	6.4	7.0	46
47	3.3	3.4	3.5	3.6	3.8	4.0	4.2	4.4	4.6	4.9	5.3	5.7	6.2	47
48	3.1	3.2	3.3	3.4	3.5	3.7	3.9	4.0	4.3	4.5	4.8	5.1	5.5	48
49	2.9	3.0	3.1	3.2	3.3	3.4	3.6	3.7	3.9	4.1	4.4	4.6	5.0	49
50	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.5	3.6	3.8	4.0	4.2	4.5	50
51	2.6	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.4	3.5	3.7	3.9	4.1	51
52	2.4	2.5	2.6	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.4	3.6	3.7	52
53	2.3	2.3	2.4	2.5	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.3	3.4	53
54	2.2	2.2	2.3	2.3	2.4	2.5	2.5	2.6	2.7	2.8	2.9	3.0	3.2	54
55	2.0	2.1	2.1	2.2	2.3	2.3	2.4	2.4	2.5	2.6	2.7	2.8	2.9	55
56	1.9	2.0	2.0	2.1	2.1	2.2	2.2	2.3	2.4	2.4	2.5	2.6	2.7	56
57	1.8	1.9	1.9	2.0	2.0	2.0	2.1	2.2	2.2	2.3	2.3	2.4	2.5	57
58	1.7	1.8	1.8	1.8	1.9	1.9	2.0	2.0	2.1	2.1	2.2	2.3	2.3	58
59	1.6	1.7	1.7	1.7	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.1	2.2	59
60	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.8	1.8	1.9	1.9	2.0	2.0	60
	25°	26°	27°	28°	29°	30°	31°	32°	33°	34°	35°	36°	37°	
	Declination of the same name as the latitude; upper transit; reduction additive.													

TABLE 26.

Variation of Altitude in one minute from meridian passage.

Latitude.	Declination of the same name as the latitude; upper transit; reduction additive.													Latitude.
	38°	39°	40°	41°	42°	43°	44°	45°	46°	47°	48°	49°	50°	
°	″	″	″	″	″	″	″	″	″	″	″	″	″	°
0	2.5	2.4	2.3	2.3	2.2	2.1	2.0	2.0	1.9	1.8	1.8	1.7	1.7	0
1	2.6	2.5	2.4	2.3	2.2	2.2	2.1	2.0	1.9	1.9	1.8	1.7	1.7	1
2	2.6	2.5	2.4	2.4	2.3	2.2	2.1	2.0	2.0	1.9	1.8	1.8	1.7	2
3	2.7	2.6	2.5	2.4	2.3	2.2	2.2	2.1	2.0	1.9	1.9	1.8	1.7	3
4	2.8	2.7	2.6	2.5	2.4	2.3	2.2	2.1	2.0	2.0	1.9	1.8	1.8	4
5	2.8	2.7	2.6	2.5	2.4	2.3	2.2	2.2	2.1	2.0	1.9	1.9	1.8	5
6	2.9	2.8	2.7	2.6	2.5	2.4	2.3	2.2	2.1	2.0	2.0	1.9	1.8	6
7	3.0	2.9	2.7	2.6	2.5	2.4	2.3	2.2	2.2	2.1	2.0	1.9	1.8	7
8	3.1	2.9	2.8	2.7	2.6	2.5	2.4	2.3	2.2	2.1	2.0	1.9	1.9	8
9	3.2	3.0	2.9	2.8	2.7	2.5	2.4	2.3	2.2	2.2	2.1	2.0	1.9	9
10	3.3	3.1	3.0	2.8	2.7	2.6	2.5	2.4	2.3	2.2	2.1	2.0	1.9	10
11	3.4	3.2	3.1	2.9	2.8	2.7	2.6	2.4	2.3	2.2	2.1	2.1	2.0	11
12	3.5	3.3	3.1	3.0	2.9	2.7	2.6	2.5	2.4	2.3	2.2	2.1	2.0	12
13	3.6	3.4	3.2	3.1	2.9	2.8	2.7	2.6	2.4	2.3	2.2	2.1	2.0	13
14	3.7	3.5	3.3	3.2	3.0	2.9	2.7	2.6	2.5	2.4	2.3	2.2	2.1	14
15	3.8	3.6	3.4	3.3	3.1	3.0	2.8	2.7	2.6	2.4	2.3	2.2	2.1	15
16	4.0	3.8	3.6	3.4	3.2	3.0	2.9	2.8	2.6	2.5	2.4	2.3	2.2	16
17	4.1	3.9	3.7	3.5	3.3	3.1	3.0	2.8	2.7	2.6	2.4	2.3	2.2	17
18	4.3	4.1	3.8	3.6	3.4	3.2	3.1	2.9	2.8	2.6	2.5	2.4	2.3	18
19	4.5	4.2	4.0	3.7	3.5	3.3	3.2	3.0	2.8	2.7	2.6	2.4	2.3	19
20	4.7	4.4	4.1	3.9	3.7	3.5	3.3	3.1	2.9	2.8	2.6	2.5	2.4	20
21	4.9	4.6	4.3	4.0	3.8	3.6	3.4	3.2	3.0	2.9	2.7	2.6	2.4	21
22	5.2	4.8	4.5	4.2	4.0	3.7	3.5	3.3	3.1	2.9	2.8	2.6	2.5	22
23	5.5	5.1	4.7	4.4	4.1	3.9	3.6	3.4	3.2	3.0	2.9	2.7	2.6	23
24	5.8	5.4	5.0	4.6	4.3	4.0	3.8	3.5	3.3	3.1	3.0	2.8	2.6	24
25	6.2	5.7	5.3	4.9	4.5	4.2	3.9	3.7	3.5	3.3	3.1	2.9	2.7	25
26	6.7	6.1	5.6	5.2	4.8	4.4	4.1	3.8	3.6	3.4	3.2	3.0	2.8	26
27	7.2	6.5	6.0	5.5	5.0	4.6	4.3	4.0	3.7	3.5	3.3	3.1	2.9	27
28	7.9	7.1	6.4	5.8	5.3	4.9	4.5	4.2	3.9	3.6	3.4	3.2	3.0	28
29	8.7	7.7	6.9	6.2	5.7	5.2	4.8	4.4	4.1	3.8	3.5	3.3	3.1	29
30	9.6	8.5	7.5	6.7	6.1	5.5	5.1	4.7	4.3	4.0	3.7	3.4	3.2	30
31	10.9	9.4	8.2	7.3	6.6	5.9	5.4	4.9	4.5	4.2	3.9	3.6	3.3	31
32	12.6	10.6	9.2	8.0	7.1	6.4	5.8	5.2	4.8	4.4	4.0	3.7	3.5	32
33	14.9	12.2	10.4	8.9	7.8	6.9	6.2	5.6	5.1	4.6	4.3	3.9	3.6	33
34	18.4	14.5	11.9	10.1	8.7	7.6	6.7	6.0	5.4	4.9	4.5	4.1	3.8	34
35		17.9	14.1	11.6	9.8	8.5	7.4	6.6	5.9	5.3	4.8	4.4	4.0	35
36			17.4	13.8	11.3	9.5	8.2	7.2	6.4	5.7	5.1	4.6	4.2	36
37				17.0	13.4	11.0	9.3	8.0	7.0	6.2	5.5	5.0	4.5	37
38					16.5	13.0	10.7	9.0	7.7	6.8	6.0	5.3	4.8	38
39						16.0	12.6	10.3	8.7	7.5	6.5	5.8	5.1	39
40							15.5	12.2	10.0	8.4	7.2	6.3	5.6	40
41								15.0	11.8	9.7	8.1	7.0	6.1	41
42	16.5								14.5	11.4	9.3	7.9	6.7	42
43	13.0	16.0								14.0	11.0	9.0	7.6	43
44	10.7	12.6	15.5								13.6	10.6	8.7	44
45	9.0	10.3	12.2	15.0								13.1	10.2	45
46	7.7	8.7	10.0	11.8	14.5								12.6	46
47	6.8	7.5	8.4	9.7	11.4	14.0								47
48	6.0	6.5	7.2	8.1	9.3	11.0	13.6							48
49	5.3	5.8	6.3	7.0	7.9	9.0	10.6	13.1						49
50	4.8	5.1	5.6	6.1	6.7	7.6	8.7	10.2	12.6					50
51	4.3	4.6	5.0	5.4	5.9	6.5	7.3	8.4	9.9	12.1				51
52	3.9	4.2	4.5	4.8	5.2	5.7	6.3	7.0	8.0	9.5	11.6			52
53	3.6	3.8	4.0	4.3	4.6	5.0	5.4	6.0	6.7	7.7	9.1	11.1		53
54	3.3	3.5	3.7	3.9	4.1	4.4	4.8	5.2	5.8	6.5	7.4	8.7	10.6	54
55	3.0	3.2	3.3	3.5	3.7	4.0	4.3	4.6	5.0	5.5	6.2	7.1	8.3	55
56	2.8	2.9	3.1	3.2	3.4	3.6	3.8	4.1	4.4	4.8	5.3	5.9	6.8	56
57	2.6	2.7	2.8	2.9	3.1	3.2	3.4	3.6	3.9	4.2	4.6	5.0	5.6	57
58	2.4	2.5	2.6	2.7	2.8	2.9	3.1	3.3	3.5	3.7	4.0	4.4	4.8	58
59	2.2	2.3	2.4	2.5	2.6	2.7	2.8	3.0	3.1	3.3	3.6	3.8	4.2	59
60	2.1	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	3.0	3.2	3.4	3.6	60
	38°	39°	40°	41°	42°	43°	44°	45°	46°	47°	48°	49°	50°	
	Declination of the same name as the latitude; upper transit; reduction additive.													

TABLE 26.

Variation of Altitude in one minute from meridian passage.

Latitude.	Declination of the same name as the latitude; upper transit; reduction additive.													Latitude.
	51°	52°	53°	54°	55°	56°	57°	58°	59°	60°	61°	62°	63°	
°	″	″	″	″	″	″	″	″	″	″	″	″	″	°
0	1.6	1.5	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.0	1.0	0
1	1.6	1.6	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.0	1
2	1.6	1.6	1.5	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.0	2
3	1.7	1.6	1.5	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.0	3
4	1.7	1.6	1.6	1.5	1.5	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.0	4
5	1.7	1.7	1.6	1.5	1.5	1.4	1.4	1.3	1.3	1.2	1.1	1.1	1.1	5
6	1.7	1.7	1.6	1.5	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.1	6
7	1.8	1.7	1.6	1.6	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.1	7
8	1.8	1.7	1.7	1.6	1.5	1.5	1.4	1.4	1.3	1.2	1.2	1.1	1.1	8
9	1.8	1.8	1.7	1.6	1.6	1.5	1.4	1.4	1.3	1.3	1.2	1.1	1.1	9
10	1.9	1.8	1.7	1.6	1.6	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.1	10
11	1.9	1.8	1.7	1.7	1.6	1.5	1.5	1.4	1.3	1.3	1.2	1.2	1.1	11
12	1.9	1.8	1.8	1.7	1.6	1.6	1.5	1.4	1.4	1.3	1.2	1.2	1.1	12
13	2.0	1.9	1.8	1.7	1.6	1.6	1.5	1.4	1.4	1.3	1.3	1.2	1.1	13
14	2.0	1.9	1.8	1.7	1.7	1.6	1.5	1.5	1.4	1.3	1.3	1.2	1.2	14
15	2.0	1.9	1.9	1.8	1.7	1.6	1.5	1.5	1.4	1.3	1.3	1.2	1.2	15
16	2.1	2.0	1.9	1.8	1.7	1.6	1.6	1.5	1.4	1.4	1.3	1.2	1.2	16
17	2.1	2.0	1.9	1.8	1.8	1.7	1.6	1.5	1.5	1.4	1.3	1.3	1.2	17
18	2.2	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.5	1.4	1.3	1.3	1.2	18
19	2.2	2.1	2.0	1.9	1.8	1.7	1.6	1.6	1.5	1.4	1.4	1.3	1.2	19
20	2.3	2.1	2.0	1.9	1.9	1.8	1.7	1.6	1.5	1.4	1.4	1.3	1.2	20
21	2.3	2.2	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.5	1.4	1.3	1.2	21
22	2.4	2.2	2.1	2.0	1.9	1.8	1.7	1.6	1.6	1.5	1.4	1.3	1.3	22
23	2.4	2.3	2.2	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.4	1.3	23
24	2.5	2.4	2.2	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.5	1.4	1.3	24
25	2.6	2.4	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.6	1.5	1.4	1.3	25
26	2.6	2.5	2.3	2.2	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	26
27	2.7	2.6	2.4	2.3	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.4	27
28	2.8	2.6	2.5	2.3	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.5	1.4	28
29	2.9	2.7	2.5	2.4	2.3	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4	29
30	3.0	2.8	2.6	2.5	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.4	30
31	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.9	1.7	1.6	1.5	1.4	31
32	3.2	3.0	2.8	2.6	2.4	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5	32
33	3.4	3.1	2.9	2.7	2.5	2.4	2.2	2.1	1.9	1.8	1.7	1.6	1.5	33
34	3.5	3.2	3.0	2.8	2.6	2.4	2.3	2.1	2.0	1.9	1.7	1.6	1.5	34
35	3.7	3.4	3.1	2.9	2.7	2.5	2.3	2.2	2.0	1.9	1.8	1.7	1.6	35
36	3.9	3.6	3.3	3.0	2.8	2.6	2.4	2.3	2.1	2.0	1.8	1.7	1.6	36
37	4.1	3.7	3.4	3.2	2.9	2.7	2.5	2.3	2.2	2.0	1.9	1.7	1.6	37
38	4.3	3.9	3.6	3.3	3.0	2.8	2.6	2.4	2.2	2.1	1.9	1.8	1.7	38
39	4.6	4.2	3.8	3.5	3.2	2.9	2.7	2.5	2.3	2.1	2.0	1.8	1.7	39
40	5.0	4.5	4.0	3.7	3.3	3.1	2.8	2.6	2.4	2.2	2.0	1.9	1.8	40
41	5.4	4.8	4.3	3.9	3.5	3.2	2.9	2.7	2.5	2.3	2.1	1.9	1.8	41
42	5.9	5.2	4.6	4.1	3.7	3.4	3.1	2.8	2.6	2.4	2.2	2.0	1.9	42
43	6.5	5.7	5.0	4.4	4.0	3.6	3.2	2.9	2.7	2.5	2.3	2.1	1.9	43
44	7.3	6.3	5.4	4.8	4.3	3.8	3.4	3.1	2.8	2.6	2.3	2.2	2.0	44
45	8.4	7.0	6.0	5.2	4.6	4.1	3.6	3.3	3.0	2.7	2.4	2.2	2.0	45
46	9.9	8.0	6.7	5.8	5.0	4.4	3.9	3.5	3.1	2.8	2.6	2.3	2.1	46
47	12.1	9.5	7.7	6.5	5.5	4.8	4.2	3.7	3.3	3.0	2.7	2.4	2.2	47
48		11.6	9.1	7.4	6.2	5.3	4.6	4.0	3.6	3.2	2.8	2.6	2.3	48
49			11.1	8.7	7.1	5.9	5.0	4.4	3.8	3.4	3.0	2.7	2.4	49
50				10.6	8.3	6.8	5.6	4.8	4.2	3.6	3.2	2.9	2.6	50
51					10.2	7.9	6.4	5.4	4.6	4.0	3.5	3.0	2.7	51
52						9.7	7.6	6.1	5.1	4.3	3.8	3.3	2.9	52
53							9.2	7.2	5.9	4.9	4.1	3.6	3.1	53
54								8.8	6.8	5.5	4.6	3.9	3.4	54
55	10.2								8.3	6.5	5.3	4.3	3.7	55
56	7.9	9.7								7.9	6.1	5.0	4.1	56
57	6.4	7.6	9.2								7.4	5.8	4.7	57
58	5.4	6.1	7.2	8.8								7.0	5.4	58
59	4.6	5.1	5.9	6.8	8.3								6.6	59
60	4.0	4.3	4.9	5.5	6.5	7.9								60
	51°	52°	53°	54°	55°	56°	57°	58°	59°	60°	61°	62°	63°	
	Declination of the same name as the latitude; upper transit; reduction additive.													

TABLE 26.

Variation of Altitude in one minute from meridian passage.

Latitude.	Declination of a different name from the latitude; upper transit; reduction additive.												Latitude.
	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	
°	″	″	″	″	″	″	″	″	″	″	″	″	°
0					28.1	22.4	18.7	16.0	14.0	12.4	11.1	10.1	0
1				28.1	22.4	18.7	16.0	14.0	12.4	11.2	10.1	9.3	1
2			28.1	22.4	18.7	16.0	14.0	12.5	11.2	10.2	9.3	8.6	2
3		28.1	22.4	18.7	16.0	14.0	12.5	11.2	10.2	9.3	8.6	8.0	3
4	28.1	22.4	18.7	16.0	14.0	12.5	11.2	10.2	9.3	8.6	8.0	7.4	4
5	22.4	18.7	16.0	14.0	12.5	11.2	10.2	9.3	8.6	8.0	7.4	7.0	5
6	18.7	16.0	14.0	12.5	11.2	10.2	9.3	8.6	8.0	7.5	7.0	6.6	6
7	16.0	14.0	12.4	11.2	10.2	9.3	8.6	8.0	7.5	7.0	6.6	6.2	7
8	14.0	12.4	11.2	10.2	9.3	8.6	8.0	7.5	7.0	6.6	6.2	5.9	8
9	12.4	11.2	10.2	9.3	8.6	8.0	7.5	7.0	6.6	6.2	5.9	5.6	9
10	11.1	10.1	9.3	8.6	8.0	7.4	7.0	6.6	6.2	5.9	5.6	5.3	10
11	10.1	9.3	8.6	8.0	7.4	7.0	6.6	6.2	5.9	5.6	5.3	5.1	11
12	9.2	8.5	7.9	7.4	7.0	6.5	6.2	5.9	5.6	5.3	5.0	4.8	12
13	8.5	7.9	7.4	6.9	6.5	6.2	5.8	5.6	5.3	5.0	4.8	4.6	13
14	7.9	7.4	6.9	6.5	6.2	5.8	5.5	5.3	5.0	4.8	4.6	4.4	14
15	7.3	6.9	6.5	6.1	5.8	5.5	5.3	5.0	4.8	4.6	4.4	4.2	15
16	6.8	6.5	6.1	5.8	5.5	5.2	5.0	4.8	4.6	4.4	4.2	4.1	16
17	6.4	6.1	5.8	5.5	5.2	5.0	4.8	4.6	4.4	4.2	4.1	3.9	17
18	6.0	5.7	5.5	5.2	5.0	4.8	4.6	4.4	4.2	4.1	3.9	3.8	18
19	5.7	5.4	5.2	4.9	4.7	4.5	4.4	4.2	4.0	3.9	3.8	3.6	19
20	5.4	5.1	4.9	4.7	4.5	4.3	4.2	4.0	3.9	3.8	3.6	3.5	20
21	5.1	4.9	4.7	4.5	4.3	4.2	4.0	3.9	3.7	3.6	3.5	3.4	21
22	4.9	4.7	4.5	4.3	4.1	4.0	3.9	3.7	3.6	3.5	3.4	3.3	22
23	4.6	4.4	4.3	4.1	4.0	3.8	3.7	3.6	3.5	3.4	3.3	3.2	23
24	4.4	4.2	4.1	3.9	3.8	3.7	3.6	3.5	3.4	3.3	3.2	3.1	24
25	4.2	4.1	3.9	3.8	3.7	3.5	3.4	3.3	3.2	3.1	3.1	3.0	25
26	4.0	3.9	3.8	3.6	3.5	3.4	3.3	3.2	3.1	3.0	3.0	2.9	26
27	3.9	3.7	3.6	3.5	3.4	3.3	3.2	3.1	3.0	2.9	2.9	2.8	27
28	3.7	3.6	3.5	3.4	3.3	3.2	3.1	3.0	2.9	2.8	2.8	2.7	28
29	3.5	3.4	3.3	3.2	3.1	3.1	3.0	2.9	2.8	2.8	2.7	2.6	29
30	3.4	3.3	3.2	3.1	3.0	3.0	2.9	2.8	2.7	2.7	2.6	2.5	30
31	3.3	3.2	3.1	3.0	2.9	2.9	2.8	2.7	2.6	2.6	2.5	2.5	31
32	3.2	3.1	3.0	2.9	2.8	2.8	2.7	2.6	2.6	2.5	2.5	2.4	32
33	3.0	2.9	2.9	2.8	2.7	2.7	2.6	2.5	2.5	2.4	2.4	2.3	33
34	2.9	2.8	2.8	2.7	2.6	2.6	2.5	2.5	2.4	2.4	2.3	2.3	34
35	2.8	2.7	2.7	2.6	2.5	2.5	2.4	2.4	2.3	2.3	2.2	2.2	35
36	2.7	2.6	2.6	2.5	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.1	36
37	2.6	2.5	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.1	2.1	37
38	2.5	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.0	38
39	2.4	2.4	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	39
40	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	1.9	1.9	40
41	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.8	41
42	2.2	2.1	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	42
43	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.7	43
44	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.7	1.7	1.7	44
45	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.6	45
46	1.9	1.9	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.6	1.6	1.6	46
47	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.6	47
48	1.8	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.6	1.5	1.5	48
49	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.5	49
50	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.4	1.4	50
51	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	51
52	1.5	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.3	52
53	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3	53
54	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3	54
55	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2	55
56	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	56
57	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	57
58	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	58
59	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	59
60	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1 0	1.0	1.0	60
	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	
	Declination of a different name from the latitude; upper transit; reduction additive.												

TABLE 26.

Variation of Altitude in one minute from meridian passage.

Latitude.	Declination of a different name from the latitude; upper transit; reduction additive.													Latitude.
	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	24°	
°	″	″	″	″	″	″	″	″	″	″	″	″	″	°
0	9.2	8.5	7.9	7.3	6.8	6.4	6.0	5.7	5.4	5.1	4.9	4.6	4.4	0
1	8.5	7.9	7.4	6.9	6.5	6.1	5.7	5.4	5.1	4.9	4.7	4.4	4.2	1
2	7.9	7.4	6.9	6.5	6.1	5.8	5.5	5.2	4.9	4.7	4.5	4.3	4.1	2
3	7.4	6.9	6.5	6.1	5.8	5.5	5.2	4.9	4.7	4.5	4.3	4.1	3.9	3
4	7.0	6.5	6.2	5.8	5.5	5.2	5.0	4.7	4.5	4.3	4.1	4.0	3.8	4
5	6.5	6.2	5.8	5.5	5.2	5.0	4.8	4.5	4.3	4.2	4.0	3.8	3.7	5
6	6.2	5.8	5.5	5.3	5.0	4.8	4.6	4.4	4.2	4.0	3.9	3.7	3.6	6
7	5.9	5.6	5.3	5.0	4.8	4.6	4.4	4.2	4.0	3.9	3.7	3.6	3.5	7
8	5.6	5.3	5.0	4.8	4.6	4.4	4.2	4.0	3.9	3.7	3.6	3.5	3.4	8
9	5.3	5.0	4.8	4.6	4.4	4.2	4.1	3.9	3.8	3.6	3.5	3.4	3.3	9
10	5.0	4.8	4.6	4.4	4.2	4.1	3.9	3.8	3.6	3.5	3.4	3.3	3.2	10
11	4.8	4.6	4.4	4.2	4.1	3.9	3.8	3.6	3.5	3.4	3.3	3.2	3.1	11
12	4.6	4.4	4.3	4.1	3.9	3.8	3.7	3.5	3.4	3.3	3.2	3.1	3.0	12
13	4.4	4.3	4.1	3.9	3.8	3.7	3.5	3.4	3.3	3.2	3.1	3.0	2.9	13
14	4.2	4.1	3.9	3.8	3.7	3.5	3.4	3.3	3.2	3.1	3.0	2.9	2.8	14
15	4.1	3.9	3.8	3.7	3.5	3.4	3.3	3.2	3.1	3.0	2.9	2.8	2.8	15
16	3.9	3.8	3.7	3.5	3.4	3.3	3.2	3.1	3.0	2.9	2.8	2.8	2.7	16
17	3.8	3.7	3.5	3.4	3.3	3.2	3.1	3.0	2.9	2.8	2.8	2.7	2.6	17
18	3.7	3.5	3.4	3.3	3.2	3.1	3.0	2.9	2.9	2.8	2.7	2.6	2.5	18
19	3.5	3.4	3.3	3.2	3.1	3.0	2.9	2.9	2.8	2.7	2.6	2.6	2.5	19
20	3.4	3.3	3.2	3.1	3.0	2.9	2.9	2.8	2.7	2.6	2.6	2.5	2.4	20
21	3.3	3.2	3.1	3.0	2.9	2.8	2.8	2.7	2.6	2.6	2.5	2.4	2.4	21
22	3.2	3.1	3.0	2.9	2.8	2.8	2.7	2.6	2.6	2.5	2.4	2.4	2.3	22
23	3.1	3.0	2.9	2.8	2.8	2.7	2.6	2.6	2.5	2.4	2.4	2.3	2.3	23
24	3.0	2.9	2.8	2.8	2.7	2.6	2.5	2.5	2.4	2.4	2.3	2.3	2.2	24
25	2.9	2.8	2.7	2.7	2.6	2.5	2.5	2.4	2.4	2.3	2.3	2.2	2.2	25
26	2.8	2.7	2.7	2.6	2.5	2.5	2.4	2.4	2.3	2.3	2.2	2.1	2.1	26
27	2.7	2.7	2.6	2.5	2.5	2.4	2.4	2.3	2.2	2.2	2.1	2.1	2.1	27
28	2.6	2.6	2.5	2.5	2.4	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.0	28
29	2.6	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.1	2.1	2.0	2.0	2.0	29
30	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.1	2.1	2.0	2.0	2.0	1.9	30
31	2.4	2.4	2.3	2.3	2.2	2.2	2.1	2.1	2.0	2.0	2.0	1.9	1.9	31
32	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.8	32
33	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.8	1.8	33
34	2.2	2.2	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.8	34
35	2.2	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.8	1.8	1.8	1.7	1.7	35
36	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.7	1.7	1.7	36
37	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.7	1.7	1.7	1.6	37
38	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.7	1.7	1.7	1.6	1.6	38
39	1.9	1.9	1.9	1.8	1.8	1.8	1.7	1.7	1.7	1.6	1.6	1.6	1.6	39
40	1.9	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.5	40
41	1.8	1.8	1.8	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.5	1.5	1.5	41
42	1.8	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5	42
43	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.4	1.4	43
44	1.7	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.4	1.4	1.4	44
45	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.4	45
46	1.6	1.6	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.3	1.3	46
47	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3	47
48	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.3	48
49	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.2	49
50	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2	50
51	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	51
52	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.1	1.1	52
53	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	53
54	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1	54
55	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	55
56	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0	56
57	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	57
58	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	58
59	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	59
60	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	60
	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	24°	
	Declination of a different name from the latitude; upper transit; reduction additive.													

TABLE 26.

Variation of Altitude in one minute from meridian passage.

Latitude.	Declination of a different name from the latitude; upper transit; reduction additive.													Latitude.
	25°	26°	27°	28°	29°	30°	31°	32°	33°	34°	35°	36°	37°	
°	″	″	″	″	″	″	″	″	″	″	″	″	″	°
0	4.2	4.0	3.9	3.7	3.5	3.4	3.3	3.1	3.0	2.9	2.8	2.7	2.6	0
1	4.1	3.9	3.7	3.6	3.4	3.3	3.2	3.1	2.9	2.8	2.7	2.6	2.6	1
2	3.9	3.8	3.6	3.5	3.3	3.2	3.1	3.0	2.9	2.8	2.7	2.6	2.5	2
3	3.8	3.6	3.5	3.4	3.2	3.1	3.0	2.9	2.8	2.7	2.6	2.5	2.4	3
4	3.7	3.5	3.4	3.3	3.2	3.0	2.9	2.8	2.7	2.6	2.6	2.5	2.4	4
5	3.6	3.4	3.3	3.2	3.1	3.0	2.9	2.8	2.7	2.6	2.5	2.4	2.3	5
6	3.4	3.3	3.2	3.1	3.0	2.9	2.8	2.7	2.6	2.5	2.4	2.4	2.3	6
7	3.3	3.2	3.1	3.0	2.9	2.8	2.7	2.6	2.5	2.5	2.4	2.3	2.2	7
8	3.2	3.1	3.0	2.9	2.8	2.7	2.7	2.6	2.5	2.4	2.3	2.3	2.2	8
9	3.1	3.0	2.9	2.9	2.8	2.7	2.6	2.5	2.4	2.4	2.3	2.2	2.2	9
10	3.1	3.0	2.9	2.8	2.7	2.6	2.5	2.5	2.4	2.3	2.2	2.2	2.1	10
11	3.0	2.9	2.8	2.7	2.6	2.5	2.5	2.4	2.3	2.3	2.2	2.1	2.1	11
12	2.9	2.8	2.7	2.6	2.6	2.5	2.4	2.3	2.3	2.2	2.2	2.1	2.0	12
13	2.8	2.7	2.7	2.6	2.5	2.4	2.4	2.3	2.2	2.2	2.1	2.1	2.0	13
14	2.7	2.7	2.6	2.5	2.4	2.4	2.3	2.3	2.2	2.1	2.1	2.0	2.0	14
15	2.7	2.6	2.5	2.5	2.4	2.3	2.3	2.2	2.1	2.1	2.0	2.0	1.9	15
16	2.6	2.5	2.5	2.4	2.3	2.3	2.2	2.2	2.1	2.0	2.0	1.9	1.9	16
17	2.5	2.5	2.4	2.3	2.3	2.2	2.2	2.1	2.1	2.0	2.0	1.9	1.9	17
18	2.5	2.4	2.4	2.3	2.2	2.2	2.1	2.1	2.0	2.0	1.9	1.9	1.8	18
19	2.4	2.4	2.3	2.2	2.2	2.1	2.1	2.0	2.0	1.9	1.9	1.8	1.8	19
20	2.4	2.3	2.3	2.2	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.8	1.8	20
21	2.3	2.3	2.2	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.8	1.8	1.7	21
22	2.3	2.2	2.2	2.1	2.1	2.0	2.0	1.9	1.9	1.8	1.8	1.7	1.7	22
23	2.2	2.2	2.1	2.1	2.0	2.0	1.9	1.9	1.8	1.8	1.8	1.7	1.7	23
24	2.2	2.1	2.1	2.0	2.0	1.9	1.9	1.8	1.8	1.8	1.7	1.7	1.6	24
25	2.1	2.1	2.0	2.0	1.9	1.9	1.8	1.8	1.8	1.7	1.7	1.6	1.6	25
26	2.1	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.7	1.7	1.7	1.6	1.6	26
27	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.7	1.7	1.7	1.6	1.6	1.6	27
28	2.0	1.9	1.9	1.9	1.8	1.8	1.7	1.7	1.7	1.6	1.6	1.6	1.5	28
29	1.9	1.9	1.9	1.8	1.8	1.7	1.7	1.7	1.6	1.6	1.6	1.5	1.5	29
30	1.9	1.8	1.8	1.8	1.7	1.7	1.7	1.6	1.6	1.6	1.5	1.5	1.5	30
31	1.8	1.8	1.8	1.7	1.7	1.7	1.6	1.6	1.6	1.5	1.5	1.5	1.5	31
32	1.8	1.8	1.7	1.7	1.7	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.4	32
33	1.8	1.7	1.7	1.7	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.4	1.4	33
34	1.7	1.7	1.7	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.4	1.4	1.4	34
35	1.7	1.7	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	35
36	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.3	36
37	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.3	1.3	37
38	1.6	1.5	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.3	1.3	1.3	38
39	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3	39
40	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.2	40
41	1.5	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.2	1.2	41
42	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	42
43	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	43
44	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	44
45	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	45
46	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	46
47	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	47
48	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1		48
49	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1			49
50	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1				50
51	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0					51
52	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0						52
53	1.1	1.1	1.1	1.1	1.0	1.0	1.0							53
54	1.1	1.0	1.0	1.0	1.0	1.0								54
55	1.0	1.0	1.0	1.0	1.0									55
56	1.0	1.0	1.0	1.0										56
57	1.0	1.0	1.0											57
58	1.0	0.9												58
59	0.9												0.8	59
60												0.8	0.8	60
	25°	26°	27°	28°	29°	30°	31°	32°	33°	34°	35°	36°	37°	
	Declination of the same name as the latitude; lower transit; reduction subtractive.													

TABLE 26.

Variation of Altitude in one minute from meridian passage.

Latitude.	Declination of a different name from the latitude; upper transit; reduction additive.													Latitude.
	38°	39°	40°	41°	42°	43°	44°	45°	46°	47°	48°	49°	50°	
°	″	″	″	″	″	″	″	″	″	″	″	″	″	°
0	2.5	2.4	2.3	2.3	2.2	2.1	2.0	2.0	1.9	1.8	1.8	1.7	1.7	0
1	2.5	2.4	2.3	2.2	2.1	2.1	2.0	1.9	1.9	1.8	1.7	1.7	1.6	1
2	2.4	2.3	2.3	2.2	2.1	2.0	2.0	1.9	1.8	1.8	1.7	1.7	1.6	2
3	2.4	2.3	2.2	2.1	2.1	2.0	1.9	1.9	1.8	1.8	1.7	1.6	1.6	3
4	2.3	2.2	2.2	2.1	2.0	2.0	1.9	1.8	1.8	1.7	1.7	1.6	1.6	4
5	2.3	2.2	2.1	2.1	2.0	1.9	1.9	1.8	1.8	1.7	1.6	1.6	1.5	5
6	2.2	2.2	2.1	2.0	2.0	1.9	1.8	1.8	1.7	1.7	1.6	1.6	1.5	6
7	2.2	2.1	2.0	2.0	1.9	1.9	1.8	1.8	1.7	1.6	1.6	1.5	1.5	7
8	2.1	2.1	2.0	1.9	1.9	1.8	1.8	1.7	1.7	1.6	1.6	1.5	1.5	8
9	2.1	2.0	2.0	1.9	1.9	1.8	1.8	1.7	1.6	1.6	1.6	1.5	1.5	9
10	2.1	2.0	1.9	1.9	1.8	1.8	1.7	1.7	1.6	1.6	1.5	1.5	1.4	10
11	2.0	2.0	1.9	1.8	1.8	1.7	1.7	1.6	1.6	1.6	1.5	1.5	1.4	11
12	2.0	1.9	1.9	1.8	1.8	1.7	1.7	1.6	1.6	1.5	1.5	1.4	1.4	12
13	1.9	1.9	1.8	1.8	1.7	1.7	1.6	1.6	1.6	1.5	1.5	1.4	1.4	13
14	1.9	1.9	1.8	1.8	1.7	1.7	1.6	1.6	1.5	1.5	1.4	1.4	1.4	14
15	1.9	1.8	1.8	1.7	1.7	1.6	1.6	1.6	1.5	1.5	1.4	1.4	1.4	15
16	1.8	1.8	1.7	1.7	1.7	1.6	1.6	1.5	1.5	1.4	1.4	1.4	1.3	16
17	1.8	1.8	1.7	1.7	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.4	1.3	17
18	1.8	1.7	1.7	1.6	1.6	1.6	1.5	1.5	1.4	1.4	1.4	1.3	1.3	18
19	1.7	1.7	1.7	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.4	1.3	1.3	19
20	1.7	1.7	1.6	1.6	1.6	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3	20
21	1.7	1.6	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3	21
22	1.7	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3	1.2	22
23	1.6	1.6	1.6	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.2	23
24	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3	1.2	1.2	24
25	1.6	1.5	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2	25
26	1.6	1.5	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2	26
27	1.5	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.2	27
28	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.1	28
29	1.5	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.1	29
30	1.5	1.4	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1	30
31	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1	31
32	1.4	1.4	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.1	32
33	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	33
34	1.4	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	34
35	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1		35
36	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1			36
37	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1				37
38	1.3	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1					38
39	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1						39
40	1.2	1.2	1.2	1.2	1.1	1.1	1.1							40
41	1.2	1.2	1.2	1.1	1.1	1.1								41
42	1.2	1.2	1.1	1.1	1.1									42
43	1.2	1.1	1.1	1.1										43
44	1.1	1.1	1.1											44
45	1.1	1.1												45
46	1.1												0.9	46
47												0.9	0.9	47
48											0.9	0.9	0.9	48
49										0.9	0.9	0.9	0.8	49
50									0.9	0.9	0.9	0.8	0.8	50
51								0.9	0.9	0.9	0.8	0.8	0.8	51
52							0.9	0.9	0.9	0.8	0.8	0.8	0.8	52
53						0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	53
54					0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	54
55				0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	55
56			0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	56
57		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	57
58	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	58
59	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	59
60	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	60
	38°	39°	40°	41°	42°	43°	44°	45°	46°	47°	48°	49°	50°	
	Declination of the same name as the latitude; lower transit; reduction subtractive.													

TABLE 26.

Variation of Altitude in one minute from meridian passage.

Latitude.	Declination of a different name from the latitude; upper transit; reduction additive.													Latitude.
	51°	52°	53°	54°	55°	56°	57°	58°	59°	60°	61°	62°	63°	
°	″	″	″	″	″	″	″	″	″	″	″	″	″	°
0	1.6	1.5	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.0	1.0	0
1	1.6	1.5	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.0	1.0	1
2	1.5	1.5	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.1	1.1	1.0	1.0	2
3	1.5	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.1	1.0	1.0	3
4	1.5	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.1	1.0	1.0	4
5	1.5	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.1	1.1	1.0	1.0	1.0	5
6	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.0	1.0	1.0	6
7	1.4	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.1	1.0	1.0	0.9	7
8	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.1	1.1	1.1	1.0	1.0	0.9	8
9	1.4	1.4	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.0	1.0	1.0	0.9	9
10	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0	0.9	10
11	1.4	1.3	1.3	1.3	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0	0.9	11
12	1.4	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.0	1.0	0.9	0.9	12
13	1.3	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.0	1.0	1.0	0.9	0.9	13
14	1.3	1.3	1.3	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9	14
15	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9	15
16	1.3	1.3	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.9	16
17	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.9	17
18	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.9	18
19	1.2	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9	19
20	1.2	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.8	20
21	1.2	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.8	21
22	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9		22
23	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.9			23
24	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9				24
25	1.2	1.1	1.1	1.1	1.0	1.0	1.0	1.0	0.9					25
26	1.1	1.1	1.1	1.1	1.0	1.0	1.0	0.9						26
27	1.1	1.1	1.1	1.0	1.0	1.0	1.0							27
28	1.1	1.1	1.1	1.0	1.0	1.0								28
29	1.1	1.1	1.0	1.0	1.0									29
30	1.1	1.1	1.0	1.0										30
31	1.1	1.0	1.0											31
32	1.1	1.0												32
33	1.1												0.8	33
34												0.8	0.7	34
35											0.8	0.8	0.7	35
36										0.8	0.8	0.8	0.7	36
37									0.8	0.8	0.8	0.7	0.7	37
38								0.8	0.8	0.8	0.8	0.7	0.7	38
39							0.8	0.8	0.8	0.8	0.8	0.7	0.7	39
40						0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	40
41					0.9	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	41
42				0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	42
43			0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	43
44		0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	44
45	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	45
46	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	46
47	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.6	47
48	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.6	48
49	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	49
50	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	50
51	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	51
52	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	52
53	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	53
54	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	54
55	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	55
56	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	56
57	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	57
58	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	58
59	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	59
60	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	60
	51°	52°	53°	54°	55°	56°	57°	58°	59°	60°	61°	62°	63°	
	Declination of the same name as the latitude; lower transit; reduction subtractive.													

TABLE 27.

Reduction to be applied to Altitudes near the Meridian.

Var. 1 min. (Table 26.)	Time from meridian passage.													Var. 1 min. (Table 26.)
	m. s. 0 30	m. s. 1 0	m. s. 1 30	m. s. 2 0	m. s. 2 30	m. s. 3 0	m. s. 3 30	m. s. 4 0	m. s. 4 30	m. s. 5 0	m. s. 5 30	m. s. 6 0	m. s. 6 30	
″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″
0.1	0 0	0 0	0 0	0 0	0 1	0 1	0 1	0 2	0 2	0 2	0 3	0 4	0 4	0.1
0.2	0 0	0 0	0 0	0 1	0 1	0 2	0 3	0 3	0 4	0 5	0 6	0 7	0 8	0.2
0.3	0 0	0 0	0 1	0 1	0 2	0 3	0 4	0 5	0 6	0 7	0 9	0 11	0 13	0.3
0.4	0 0	0 0	0 1	0 2	0 2	0 4	0 5	0 6	0 8	0 10	0 12	0 14	0 17	0.4
0.5	0 0	0 0	0 1	0 2	0 3	0 4	0 6	0 8	0 10	0 12	0 15	0 18	0 21	0.5
0.6	0 0	0 1	0 1	0 2	0 4	0 5	0 7	0 10	0 12	0 15	0 18	0 22	0 25	0.6
0.7	0 0	0 1	0 2	0 3	0 4	0 6	0 9	0 11	0 14	0 17	0 21	0 25	0 30	0.7
0.8	0 0	0 1	0 2	0 3	0 5	0 7	0 10	0 13	0 16	0 20	0 24	0 29	0 34	0.8
0.9	0 0	0 1	0 2	0 4	0 6	0 8	0 11	0 14	0 18	0 22	0 27	0 32	0 38	0.9
1.0	0 0	0 1	0 2	0 4	0 6	0 9	0 12	0 16	0 20	0 25	0 30	0 36	0 42	1.0
2.0	0 0	0 2	0 4	0 8	0 12	0 18	0 24	0 32	0 41	0 50	1 0	1 12	1 24	2.0
3.0	0 1	0 3	0 7	0 12	0 19	0 27	0 37	0 48	1 1	1 15	1 31	1 48	2 6	3.0
4.0	0 1	0 4	0 9	0 16	0 25	0 36	0 49	1 4	1 21	1 40	2 1	2 24	2 49	4.0
5.0	0 1	0 5	0 11	0 20	0 31	0 45	1 1	1 20	1 41	2 5	2 31	3 0	3 31	5.0
6.0	0 1	0 6	0 13	0 24	0 37	0 54	1 13	1 36	2 1	2 30	3 1	3 36	4 13	6.0
7.0	0 2	0 7	0 16	0 28	0 44	1 3	1 26	1 52	2 22	2 55	3 32	4 12	4 56	7.0
8.0	0 2	0 8	0 18	0 32	0 50	1 12	1 38	2 8	2 42	3 20	4 2	4 48	5 38	8.0
9.0	0 2	0 9	0 20	0 36	0 56	1 21	1 50	2 24	3 2	3 45	4 32	5 24	6 20	9.0
10.0	0 2	0 10	0 22	0 40	1 2	1 30	2 3	2 40	3 23	4 10	5 2	6 0	7 2	10.0
11.0	0 3	0 11	0 25	0 44	1 9	1 39	2 15	2 56	3 43	4 35	5 32	6 36	7 45	11.0
12.0	0 3	0 12	0 27	0 48	1 15	1 48	2 27	3 12	4 3	5 0	6 3	7 12	8 27	12.0
13.0	0 3	0 13	0 29	0 52	1 21	1 57	2 39	3 28	4 23	5 25	6 33	7 48	9 9	13.0
14.0	0 3	0 14	0 31	0 56	1 27	2 6	2 51	3 44	4 43	5 50	7 4	8 24	9 51	14.0
15.0	0 4	0 15	0 34	1 0	1 34	2 15	3 4	4 0	5 3	6 15	7 34	9 0	10 34	15.0
16.0	0 4	0 16	0 36	1 4	1 40	2 24	3 16	4 16	5 24	6 40	8 4	9 36	11 16	16.0
17.0	0 4	0 17	0 38	1 8	1 46	2 33	3 28	4 32	5 44	7 5	8 34	10 12	11 58	17.0
18.0	0 4	0 18	0 40	1 12	1 52	2 42	3 40	4 48	6 4	7 30	9 4	10 48	12 40	18.0
19.0	0 5	0 19	0 43	1 16	1 59	2 51	3 53	5 4	6 25	7 55	9 35	11 24	13 23	19.0
20.0	0 5	0 20	0 45	1 20	2 5	3 0	4 5	5 20	6 45	8 20	10 5	12 0	14 5	20.0
21.0	0 5	0 21	0 47	1 24	2 11	3 9	4 17	5 36	7 5	8 45	10 35	12 36	14 47	21.0
22.0	0 5	0 22	0 49	1 28	2 17	3 18	4 30	5 52	7 25	9 10	11 5	13 12	15 29	22.0
23.0	0 6	0 23	0 52	1 32	2 24	3 27	4 42	6 8	7 46	9 35	11 36	13 48	16 12	23.0
24.0	0 6	0 24	0 54	1 36	2 30	3 36	4 54	6 24	8 6	10 0	12 6	14 24	16 54	24.0
25.0	0 6	0 25	0 56	1 40	2 36	3 45	5 6	6 40	8 26	10 25	12 36	15 0		25.0
26.0	0 6	0 26	0 58	1 44	2 42	3 54	5 18	6 56	8 46	10 50	13 6			26.0
27.0	0 7	0 27	1 1	1 48	2 49	4 3	5 30	7 12	9 7	11 15				27.0
28.0	0 7	0 28	1 3	1 52	2 55	4 12	5 43	7 28	9 27	11 40				28.0

TABLE 27.

Reduction to be applied to Altitudes near the Meridian.

Var. 1 min. (Table 26.)	Time from meridian passage.													Var. 1 min. (Table 26.)
	m. s. 7 0	m. s. 7 30	m. s. 8 0	m. s. 8 30	m. s. 9 0	m. s. 9 30	m. s. 10 0	m. s. 10 30	m. s. 11 0	m. s. 11 30	m. s. 12 0	m. s. 12 30	m. s. 13 0	
″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″
0.1	0 5	0 6	0 6	0 7	0 8	0 9	0 10	0 11	0 12	0 13	0 14	0 16	0 17	0.1
0.2	0 10	0 11	0 13	0 14	0 16	0 18	0 20	0 22	0 24	0 26	0 29	0 31	0 34	0.2
0.3	0 15	0 17	0 19	0 22	0 24	0 27	0 30	0 33	0 36	0 40	0 43	0 47	0 51	0.3
0.4	0 20	0 23	0 26	0 29	0 32	0 36	0 40	0 44	0 48	0 53	0 58	1 2	1 8	0.4
0.5	0 24	0 28	0 32	0 36	0 40	0 45	0 50	0 55	1 0	1 6	1 12	1 18	1 24	0.5
0.6	0 29	0 34	0 38	0 43	0 49	0 54	1 0	1 6	1 13	1 19	1 26	1 34	1 41	0.6
0.7	0 34	0 39	0 45	0 51	0 57	1 3	1 10	1 17	1 25	1 33	1 41	1 49	1 58	0.7
0.8	0 39	0 45	0 51	0 58	1 5	1 12	1 20	1 28	1 37	1 46	1 55	2 5	2 15	0.8
0.9	0 44	0 51	0 57	1 5	1 13	1 21	1 30	1 39	1 49	1 59	2 10	2 21	2 32	0.9
1.0	0 49	0 56	1 4	1 12	1 21	1 30	1 40	1 50	2 1	2 12	2 24	2 36	2 49	1.0
2.0	1 38	1 52	2 8	2 24	2 42	3 0	3 20	3 40	4 2	4 24	4 48	5 12	5 38	2.0
3.0	2 27	2 49	3 12	3 37	4 3	4 30	5 0	5 31	6 3	6 37	7 12	7 49	8 27	3.0
4.0	3 16	3 45	4 16	4 49	5 24	6 1	6 40	7 21	8 4	8 49	9 36	10 25	11 16	4.0
5.0	4 5	4 41	5 20	6 1	6 45	7 31	8 20	9 11	10 5	11 1	12 0	13 1	14 5	5.0
6.0	4 54	5 37	6 24	7 14	8 6	9 1	10 0	11 1	12 6	13 13	14 24	15 37	16 54	6.0
7.0	5 43	6 34	7 28	8 26	9 27	10 32	11 40	12 52	14 7	15 26	16 48	18 14	19 43	7.0
8.0	6 32	7 30	8 32	9 38	10 48	12 2	13 20	14 42	16 8	17 38	19 12	20 50	22 32	8.0
9.0	7 21	8 26	9 36	10 50	12 9	13 32	15 0	16 32	18 9	19 50	21 36	23 26	25 21	9.0
10.0	8 10	9 22	10 40	12 2	13 30	15 2	16 40	18 22	20 10	22 2	24 0	26 2	28 10	10.0
11.0	8 59	10 19	11 44	13 15	14 51	16 33	18 20	20 13	22 11	24 15	26 24	28 39		11.0
12.0	9 48	11 15	12 48	14 27	16 12	18 3	20 0	22 3	24 12	26 27	28 48			12.0
13.0	10 37	12 11	13 52	15 39	17 33	19 33	21 40	23 53	26 13	28 39				13.0
14.0	11 26	13 7	14 56	16 51	18 54	21 3	23 20	25 43	28 14					14.0
15.0	12 15	14 4	16 0	18 14	20 15	22 34	25 0	27 34						15.0
16.0	13 4	15 0	17 4	19 16	21 36	24 4	26 40							16.0
17.0	13 53	15 56	18 8	20 28	22 57	25 34								17.0
18.0	14 42	16 52	19 12	21 40	24 18									18.0
19.0	15 31	17 49	20 16											19.0
20.0	16 20	18 45												20.0
21.0	17 9													21.0

TABLE 27.

Reduction to be applied to Altitudes near the Meridian

Var. 1 min. (Table 26.)	Time from meridian passage.													Var. 1 min. (Table 26.)
	m. s. 13 30	m. s. 14 0	m. s. 14 30	m. s. 15 0	m. s. 15 30	m. s. 16 0	m. s. 16 30	m. s. 17 0	m. s. 17 30	m. s. 18 0	m. s. 18 30	m. s. 19 0	m. s. 19 30	
″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″
0.1	0 18	0 20	0 21	0 22	0 24	0 26	0 27	0 29	0 31	0 32	0 34	0 36	0 38	0.1
0.2	0 36	0 39	0 42	0 45	0 48	0 51	0 54	0 58	1 1	1 5	1 8	1 12	1 16	0.2
0.3	0 55	0 59	1 3	1 7	1 12	1 17	1 22	1 27	1 32	1 37	1 43	1 48	1 54	0.3
0.4	1 13	1 18	1 24	1 30	1 36	1 42	1 49	1 56	2 2	2 10	2 17	2 24	2 32	0.4
0.5	1 31	1 38	1 45	1 52	2 0	2 8	2 16	2 24	2 33	2 42	2 51	3 1	3 10	0.5
0.6	1 49	1 58	2 6	2 15	2 24	2 34	2 43	2 53	3 4	3 14	3 25	3 37	3 48	0.6
0.7	2 8	2 17	2 27	2 37	2 48	2 59	3 11	3 22	3 34	3 47	4 0	4 13	4 26	0.7
0.8	2 26	2 37	2 48	3 0	3 12	3 25	3 38	3 51	4 5	4 19	4 34	4 49	5 4	0.8
0.9	2 44	2 56	3 9	3 22	3 36	3 50	4 5	4 20	4 36	4 52	5 8	5 25	5 42	0.9
1.0	3 2	3 16	3 30	3 45	4 0	4 16	4 32	4 49	5 6	5 24	5 42	6 1	6 20	1.0
2.0	6 4	6 32	7 0	7 30	8 0	8 32	9 4	9 38	10 12	10 48	11 24	12 2	12 40	2.0
3.0	9 7	9 48	10 30	11 15	12 1	12 48	13 38	14 27	15 19	16 12	17 7	18 3	19 1	3.0
4.0	12 9	13 14	14 1	15 0	16 1	17 4	18 9	19 16	20 25	21 36	22 49	24 4	25 21	4.0
5.0	15 11	16 20	17 31	18 45	20 1	21 20	22 41	24 5	25 31	27 0	28 31			5.0
6.0	18 13	19 36	21 2	22 30	24 1	25 36	27 13							6.0
7.0	21 16	22 52	24 32	26 15	28 1									7.0
8.0	24 18	26 8	28 2											8.0
9.0	27 20													9.0

Var. 1 min. (Table 26.)	Time from meridian passage.													Var. 1 min. (Table 26.)
	m. s. 20 0	m. s. 20 30	m. s. 21 0	m. s. 21 30	m. s. 22 0	m. s. 22 30	m. s. 23 0	m. s. 23 30	m. s. 24 0	m. s. 24 30	m. s. 25 0	m. s. 25 30	m. s. 26 0	
″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″
0.1	0 40	0 42	0 44	0 46	0 48	0 51	0 53	0 55	0 58	1 0	1 2	1 6	1 8	0.1
0.2	1 20	1 24	1 28	1 32	1 37	1 41	1 46	1 50	1 55	2 0	2 5	2 10	2 15	0.2
0.3	2 0	2 6	2 12	2 19	2 25	2 32	2 39	2 46	2 53	3 0	3 7	3 15	3 23	0.3
0.4	2 40	2 48	2 56	3 5	3 14	3 22	3 32	3 41	3 50	4 0	4 10	4 20	4 30	0.4
0.5	3 20	3 30	3 41	3 51	4 2	4 13	4 24	4 36	4 48	5 0	5 12	5 25	5 38	0.5
0.6	4 0	4 12	4 25	4 37	4 50	5 4	5 17	5 31	5 46	6 0	6 15	6 30	6 46	0.6
0.7	4 40	4 54	5 9	5 24	5 39	5 54	6 10	6 27	6 43	7 0	7 17	7 35	7 53	0.7
0.8	5 20	5 36	5 53	6 10	6 27	6 45	7 3	7 22	7 41	8 0	8 20	8 40	9 1	0.8
0.9	6 0	6 18	6 37	6 56	7 16	7 36	7 56	8 17	8 38	9 0	9 22	9 45	10 8	0.9
1.0	6 40	7 0	7 21	7 42	8 4	8 26	8 49	9 12	9 36	10 0	10 25	10 50	11 16	1.0
2.0	13 20	14 0	14 42	15 24	16 8	16 52	17 38	18 24	19 12	20 0	20 50	21 40	22 32	2.0
3.0	20 0	21 0	22 3	23 7	24 12	25 19	26 27	27 37	28 48	30 0				3.0
4.0	26 40	28 1	29 24											4.0

TABLE 28A.

For finding the Latitude of a place by Altitudes of Polaris.

[A=1st correction. Argument, the star's hour angle (or 24h—the star's hour angle).]

	0^h		1^h		2^h		3^h		4^h		5^h		
m.	° ′ ″	″	° ′ ″	″	° ′ ″	″	° ′ ″	″	° ′ ″	″	° ′ ″	″	m.
0	−1 12 00.0		−1 09 32.8		−1 02 21.4		−0 50 54.9		−0 36 00.0		−0 18 38.2		60
1	11 59.9	.0	09 27.9	4.9	02 11.9	9.5	50 41.6	13.3	35 43.7	16.3	18 20.0	18.2	59
2	11 59.8	.1	09 22.9	5.0	02 02.4	9.5	50 28.2	13.4	35 27.3	16.4	18 01.8	18.2	58
3	11 59.6	.1	09 17.9	5.0	01 52.8	9.6	50 14.7	13.5	35 10.9	16.4	17 43.5	18.3	57
4	11 59.3	.3	09 12.7	5.2	01 43.1	9.7	50 01.2	13.5	34 54.5	16.4	17 25.2	18.3	56
5	−1 11 58.9	.4	−1 09 07.4	5.3	−1 01 33.4	9.7	−0 49 47.6	13.6	−0 34 38.1	16.4	−0 17 06.9	18.3	55
6	11 58.5	.4	09 02.1	5.3	01 23.6	9.8	49 33.9	13.7	34 21.6	16.5	16 48.6	18.3	54
7	11 58.0	.5	08 56.7	5.4	01 13.7	9.9	49 20.2	13.7	34 05.0	16.6	16 30.3	18.3	53
8	11 57.4	.6	08 51.3	5.4	01 03.7	10.0	49 06.5	13.7	33 48.4	16.6	16 11.9	18.4	52
9	11 56.7	.7	08 45.8	5.5	00 53.7	10.0	48 52.7	13.8	33 31.7	16.7	15 53.5	18.4	51
10	−1 11 55.9	.8	−1 08 40.2	5.6	−1 00 43.6	10.1	−0 48 38.8	13.9	−0 33 15.0	16.7	−0 15 35.1	18.4	50
11	11 55.0	.9	08 34.4	5.8	00 33.4	10.2	48 24.8	14.0	32 58.2	16.8	15 16.7	18.4	49
12	11 54.1	.9	08 28.6	5.8	00 23.2	10.2	48 10.8	14.0	32 41.4	16.8	14 58.3	18.4	48
13	11 53.1	1.0	08 22.7	5.9	00 12.9	10.3	47 56.8	14.0	32 24.6	16.8	14 39.9	18.4	47
14	11 52.0	1.1	08 16.8	5.9	00 02.6	10.3	47 42.7	14.1	32 07.8	16.8	14 21.5	18.4	46
15	−1 11 50.8	1.2	−1 08 10.8	6.0	−0 59 52.1	10.5	−0 47 28.6	14.1	−0 31 50.9	16.9	−0 14 03.0	18.5	45
16	11 49.5	1.3	08 04.7	6.1	59 41.6	10.5	47 14.4	14.2	31 34.0	16.9	13 44.5	18.5	44
17	11 48.1	1.4	07 58.5	6.2	59 31.0	10.6	47 00.2	14.2	31 27.1	16.9	13 26.0	18.5	43
18	11 46.7	1.4	07 52.3	6.2	59 20.4	10.6	46 45.9	14.3	31 10.1	17.0	13 07.5	18.5	42
19	11 45.2	1.5	07 46.0	6.3	59 09.7	10.7	46 31.5	14.4	30 53.0	17.1	12 48.9	18.6	41
20	−1 11 43.6	1.6	−1 07 39.6	6.4	−0 58 58.9	10.8	−0 46 17.1	14.4	−0 30 36.0	17.0	−0 12 30.3	18.6	40
21	11 41.9	1.7	07 33.1	6.5	58 48.0	10.9	46 02.6	14.5	30 18.9	17.1	12 11.7	18.6	39
22	11 40.1	1.8	07 26.5	6.6	58 37.1	10.9	45 48.1	14.5	30 01.7	17.2	11 53.1	18.6	38
23	11 38.3	1.8	07 19.9	6.6	58 26.2	10.9	45 33.5	14.6	29 44.5	17.2	11 34.5	18.6	37
24	11 36.3	2.0	07 13.1	6.8	58 15.1	11.1	45 18.9	14.6	29 17.3	17.2	11 15.9	18.6	36
25	−1 11 34.3	2.0	−1 07 06.3	6.8	−0 58 04.0	11.1	−0 45 04.2	14.7	−0 29 00.1	17.2	−0 10 57.2	18.7	35
26	11 32.2	2.1	06 59.5	6.8	57 52.8	11.2	44 49.4	14.8	28 42.8	17.3	10 38.6	18.6	34
27	11 30.0	2.2	06 52.5	7.0	57 41.6	11.2	44 34.6	14.8	28 25.5	17.3	10 20.0	18.6	33
28	11 27.8	2.2	06 45.5	7.0	57 30.3	11.3	44 19.8	14.8	28 08.2	17.3	10 01.4	18.6	32
29	11 25.5	2.3	06 38.4	7.1	57 18.9	11.4	44 04.9	14.9	27 50.8	17.4	09 42.7	18.7	31
30	−1 11 23.1	2.4	−1 06 31.2	7.2	−0 57 07.5	11.4	−0 43 50.0	14.9	−0 27 33.4	17.4	−0 09 24.0	18.7	30
31	11 20.6	2.5	06 24.0	7.2	56 56.0	11.5	43 35.0	15.0	27 16.0	17.4	09 05.3	18.7	29
32	11 18.0	2.6	06 16.7	7.3	56 44.4	11.6	43 20.0	15.0	26 58.5	17.5	08 46.6	18.7	28
33	11 15.3	2.7	06 09.3	7.4	56 32.8	11.6	43 05.0	15.0	26 41.0	17.5	08 27.9	18.7	27
34	11 12.6	2.7	06 01.8	7.5	56 21.1	11.7	42 49.9	15.1	26 23.5	17.5	08 09.1	18.7	26
35	−1 11 09.7	2.9	−1 05 54.2	7.6	−0 56 09.3	11.8	−0 42 34.7	15.2	−0 26 05.9	17.6	−0 07 50.4	18.7	25
36	11 06.8	2.9	05 46.6	7.6	55 57.5	11.8	42 19.5	15.2	25 48.3	17.6	07 31.7	18.7	24
37	11 03.8	3.0	05 38.9	7.7	55 45.6	11.9	42 04.2	15.3	25 30.7	17.6	07 12.9	18.7	23
38	11 00.8	3.0	05 31.1	7.8	55 33.6	12.0	41 48.9	15.3	25 13.1	17.6	06 54.1	18.8	22
39	10 57.6	3.2	05 23.3	7.8	55 21.6	12.0	41 33.6	15.3	24 55.4	17.7	06 35.3	18.8	21
40	−1 10 54.4	3.2	−1 05 15.3	8.0	−0 55 09.5	12.1	−0 41 18.2	15.4	−0 24 37.7	17.7	−0 06 16.6	18.7	20
41	10 51.1	3.3	05 07.3	8.0	54 57.4	12.1	41 02.7	15.5	24 20.0	17.7	05 57.8	18.8	19
42	10 47.7	3.4	04 59.3	8.0	54 45.2	12.2	40 47.2	15.5	24 02.2	17.8	05 39.0	18.8	18
43	10 44.2	3.5	04 51.1	8.2	54 32.9	12.3	40 31.6	15.6	23 44.4	17.8	05 20.2	18.8	17
44	10 40.7	3.5	04 42.9	8.2	54 20.6	12.3	40 16.0	15.6	23 26.6	17.8	05 01.4	18.8	16
45	−1 10 37.0	3.7	−1 04 34.6	8.3	−0 54 08.2	12.4	−0 40 00.3	15.7	−0 23 08.8	17.8	−0 04 42.6	18.8	15
46	10 33.3	3.7	04 26.2	8.4	53 55.7	12.5	39 44.6	15.7	22 50.9	17.9	04 23.8	18.8	14
47	10 29.5	3.8	04 17.8	8.4	53 43.2	12.5	39 28.9	15.7	22 33.0	17.9	04 05.0	18.8	13
48	10 25.6	3.9	04 09.3	8.5	53 30.6	12.6	39 13.1	15.8	22 15.1	17.9	03 46.2	18.8	12
49	10 21.7	3.9	04 00.7	8.6	53 18.0	12.6	38 57.3	15.8	21 57.2	17.9	03 27.4	18.8	11
50	−1 10 17.6	4.1	−1 03 52.0	8.7	−0 53 05.3	12.7	−0 38 41.4	15.9	−0 21 39.2	18.0	−0 03 08.5	18.9	10
51	10 13.5	4.1	03 43.3	8.7	52 52.5	12.8	38 25.5	15.9	21 21.2	18.0	02 49.7	18.8	9
52	10 09.3	4.2	03 34.5	8.8	52 39.7	12.8	38 09.5	16.0	21 03.2	18.0	02 30.9	18.8	8
53	10 05.0	4.3	03 25.6	8.9	52 26.8	12.9	37 53.5	16.0	20 45.2	18.0	02 12.0	18.9	7
54	10 00.7	4.3	03 16.6	9.0	52 13.8	13.0	37 37.4	16.1	20 27.1	18.1	01 53.2	18.8	6
55	−1 09 56.2	4.5	−1 03 07.6	9.0	−0 52 00.8	13.0	−0 37 21.3	16.1	−0 20 09.0	18.1	−0 01 34.4	18.8	5
56	09 51.7	4.5	02 58.6	9.0	51 47.8	13.0	37 05.1	16.2	19 50.9	18.1	01 15.5	18.9	4
57	09 47.1	4.6	02 49.4	9.2	51 34.7	13.1	36 48.9	16.2	19 32.8	18.1	00 56.7	18.8	3
58	09 42.4	4.7	02 40.2	9.2	51 21.5	13.2	36 32.6	16.3	19 14.6	18.2	00 37.8	18.9	2
59	09 37.7	4.7	02 30.8	9.4	51 08.2	13.3	36 16.3	16.3	18 56.4	18.2	00 18.9	18.9	1
60	−1 09 32.8	4.9	−1 02 21.4	9.4	−0 50 54.9	13.3	−0 36 00.0	16.3	−0 18 38.2	18.2	−0 00 00.0	18.9	0
m.	11^h		10^h		9^h		8^h		7^h		6^h		m.

Change the sign to + when the argument is found at the bottom.

TABLE 28B.

For finding the Latitude of a place by Altitudes of Polaris.

[B=the 2d correction. This correction is always additive.]

Star's hour angle.	Star's altitude.																				Star's hour angle.
	10°		15°		16°		17°		18°		19°		20°		21°		22°		23°		
h. m.	″		″		″		″		″		″		″		″		″		″		h. m.
0 00	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		12 00
10	0.0	.0	0.0	.0	0.0	.0	0.0	.0	0.0	.0	0.0	.0	0.0	.0	0.0	.0	0.0	.0	0.0	.0	11 50
20	0.1	.1	0.1	.1	0.1	.1	0.1	.1	0.1	.1	0.1	.1	0.1	.1	0.1	.1	0.1	.1	0.1	.1	40
30	0.2	.1	0.2	.1	0.2	.1	0.2	.1	0.2	.1	0.2	.1	0.3	.2	0.3	.2	0.3	.2	0.3	.2	30
40	0.3	.1	0.3	.1	0.4	.2	0.4	.2	0.4	.2	0.5	.3	0.5	.2	0.5	.2	0.6	.3	0.6	.3	20
50	0.4	.1	0.5	.2	0.6	.2	0.6	.2	0.7	.3	0.8	.3	0.8	.3	0.8	.3	0.9	.3	0.9	.3	10
1 00	0.5	.1	0.8	.3	0.9	.3	0.9	.3	1.0	.3	1.1	.3	1.1	.3	1.1	.3	1.2	.3	1.3	.4	00
10	0.7	.2	1.1	.3	1.2	.3	1.2	.3	1.3	.3	1.4	.3	1.4	.3	1.5	.4	1.6	.4	1.7	.4	10 50
20	0.9	.2	1.4	.3	1.5	.3	1.6	.4	1.7	.4	1.8	.4	1.9	.5	2.0	.5	2.1	.5	2.2	.5	40
30	1.1	.2	1.8	.4	1.8	.3	2.0	.4	2.1	.4	2.3	.5	2.4	.5	2.5	.5	2.7	.6	2.8	.6	30
40	1.4	.3	2.2	.4	2.3	.5	2.4	.4	2.6	.5	2.8	.5	2.9	.5	3.1	.6	3.2	.5	3.4	.6	20
50	1.7	.3	2.6	.4	2.8	.5	2.9	.5	3.1	.5	3.3	.5	3.5	.6	3.7	.6	3.8	.6	4.0	.6	10
2 00	2.0	.3	3.0	.4	3.2	.4	3.4	.5	3.6	.5	3.9	.6	4.1	.6	4.4	.7	4.5	.7	4.7	.7	00
10	2.3	.3	3.5	.5	3.7	.5	3.9	.5	4.2	.6	4.5	.6	4.8	.7	5.0	.6	5.3	.8	5.5	.8	9 50
20	2.6	.3	4.0	.5	4.3	.6	4.5	.6	4.9	.7	5.1	.6	5.4	.6	5.7	.7	6.0	.7	6.3	.8	40
30	2.9	.3	4.5	.5	4.8	.5	5.1	.6	5.5	.6	5.8	.7	6.1	.7	6.4	.7	6.8	.8	7.1	.8	30
40	3.3	.4	5.0	.5	5.3	.5	5.7	.6	6.1	.6	6.4	.6	6.8	.7	7.2	.8	7.5	.7	7.9	.8	20
50	3.6	.3	5.5	.5	5.9	.6	6.3	.6	6.7	.6	7.1	.7	7.5	.7	7.9	.7	8.3	.8	8.7	.8	10
3 00	4.0	.4	6.0	.5	6.5	.6	6.9	.6	7.4	.7	7.8	.7	8.3	.8	8.7	.8	9.1	.8	9.5	.8	00
10	4.3	.3	6.6	.6	7.0	.5	7.5	.6	8.0	.6	8.4	.6	8.9	.6	9.4	.7	9.9	.8	10.4	.9	8 50
20	4.7	.4	7.1	.5	7.6	.6	8.1	.6	8.6	.6	9.1	.7	9.6	.7	10.2	.8	10.7	.8	11.3	.9	40
30	5.0	.3	7.6	.5	8.2	.6	8.6	.5	9.2	.6	9.8	.7	10.4	.8	10.9	.7	11.5	.8	12.1	.8	30
40	5.3	.3	8.1	.5	8.7	.5	9.2	.6	9.9	.7	10.4	.6	11.0	.6	11.6	.7	12.2	.7	12.9	.8	20
50	5.7	.4	8.6	.5	9.2	.5	9.8	.6	10.5	.6	11.1	.7	11.7	.7	12.3	.7	13.0	.8	13.7	.8	10
4 00	6.0	.3	9.1	.5	9.7	.5	10.4	.6	11.0	.5	11.7	.6	12.3	.6	13.0	.7	13.7	.7	14.4	.7	00
10	6.3	.3	9.6	.5	10.2	.5	10.9	.5	11.6	.6	12.2	.5	13.0	.7	13.6	.6	14.3	.6	15.0	.6	7 50
20	6.6	.3	10.0	.4	10.7	.5	11.3	.4	12.1	.5	12.8	.6	13.6	.6	14.3	.7	14.9	.6	15.7	.7	40
30	6.8	.2	10.4	.4	11.1	.4	11.7	.4	12.5	.4	13.3	.5	14.0	.4	14.8	.5	15.6	.7	16.3	.6	30
40	7.0	.2	10.8	.4	11.4	.3	12.1	.4	13.0	.5	13.8	.5	14.5	.5	15.3	.5	16.1	.5	16.9	.6	20
50	7.3	.3	11.1	.3	11.8	.4	12.5	.4	13.4	.4	14.2	.4	15.0	.5	15.8	.5	16.6	.5	17.5	.6	10
5 00	7.5	.2	11.4	.3	12.1	.3	12.9	.4	13.7	.3	14.5	.3	15.4	.4	16.2	.4	17.1	.5	17.9	.4	00
10	7.6	.1	11.6	.2	12.4	.3	13.2	.3	14.0	.3	14.8	.3	15.7	.3	16.5	.3	17.4	.3	18.3	.4	6 50
20	7.8	.2	11.7	.1	12.6	.2	13.4	.2	14.2	.2	15.1	.3	16.0	.3	16.8	.3	17.7	.3	18.6	.3	40
30	7.9	.1	11.9	.2	12.7	.1	13.6	.2	14.4	.2	15.3	.2	16.2	.2	17.1	.3	18.0	.3	18.9	.3	30
40	7.9	.0	12.0	.1	12.9	.2	13.7	.1	14.6	.2	15.5	.2	16.4	.2	17.3	.2	18.1	.1	19.0	.1	20
50	7.9	.0	12.1	.1	13.0	.1	13.8	.1	14.7	.1	15.6	.1	16.5	.1	17.3	.0	18.2	.1	19.1	.1	10
6 00	7.9	.0	12.2	.1	13.0	.0	13.9	.1	14.7	.0	15.6	.0	16.5	.0	17.3	.0	18.3	.1	19.2	.1	6 00

TABLE 28C.

[C=the 3d correction. Hor. Arg., the star's declination. Vert. Arg., B=the 2d correction.]

B.	88° 47′				88° 48′						88° 49′		
	20″	30″	40″	50″	0″	10″	20″	30″	40″	50″	0″	10″	20″
″	″	″	″	″	″	″	″	″	″	″	″	″	″
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	+0.2	+0.1	+0.1	+0.0	0.0	−0.0	−0.1	−0.1	−0.2	−0.2	−0.3	−0.4	−0.4
20	0.4	0.3	0.2	0.1	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
30	0.6	0.5	0.3	0.1	0.0	0.1	0.3	0.5	0.6	0.7	0.8	1.1	1.2
40	0.8	0.6	0.4	0.2	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.5	1.6
50	+1.0	+0.7	+0.5	+0.2	0.0	−0.2	−0.5	−0.9	−1.0	−1.2	−1.5	−1.7	−2.1

NOTE.—Below 15° B is nearly proportional to the altitude.

TABLE 28B.

For finding the Latitude of a place by Altitudes of Polaris.

[B=the 2d correction. This correction is always additive.]

Star's hour angle.	Star's altitude.																				Star's hour angle.
	24°		25°		26°		27°		28°		29°		30°		31°		32°		33°		
h. m.	″		″		″		″		″		″		″		″		″		″		h. m.
0 00	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		12 00
10	0.0	.0	0.0	.0	0.0	.0	0.0	.0	0.0	.0	0.0	.0	0.0	.0	0.0	.0	0.0	.0	0.0	.0	11 50
20	0.1	.1	0.1	.1	0.2	.2	0.2	.2	0.2	.2	0.2	.2	0.2	.2	0.2	.2	0.2	.2	0.2	.2	40
30	0.3	.2	0.3	.2	0.4	.2	0.4	.2	0.4	.2	0.4	.2	0.4	.2	0.5	.3	0.5	.3	0.5	.3	30
40	0.6	.3	0.6	.3	0.7	.3	0.7	.3	0.7	.3	0.7	.3	0.8	.4	0.8	.3	0.8	.3	0.9	.4	20
50	1.0	.4	1.0	.4	1.1	.4	1.1	.4	1.1	.4	1.1	.4	1.2	.4	1.3	.5	1.3	.5	1.4	.5	10
1 00	1.4	.4	1.4	.4	1.5	.4	1.5	.4	1.6	.5	1.7	.6	1.7	.5	1.8	.5	1.9	.6	1.9	.5	00
10	1.8	.4	1.9	.5	2.0	.5	2.1	.6	2.2	.6	2.3	.6	2.3	.6	2.4	.6	2.5	.6	2.6	.7	10 50
20	2.3	.5	2.4	.5	2.5	.5	2.7	.6	2.8	.6	2.9	.6	3.0	.7	3.2	.8	3.3	.8	3.4	.8	40
30	2.9	.6	3.1	.7	3.2	.7	3.4	.7	3.5	.7	3.6	.7	3.8	.8	4.0	.8	4.1	.8	4.3	.9	30
40	3.6	.7	3.8	.7	4.0	.8	4.1	.7	4.3	.8	4.5	.9	4.7	.9	4.9	.9	5.0	.9	5.3	1.0	20
50	4.3	.7	4.5	.7	4.7	.7	4.9	.8	5.1	.8	5.3	.8	5.6	.9	5.8	.9	6.0	1.0	6.2	.9	10
2 00	5.0	.7	5.3	.8	5.5	.8	5.8	.9	6.0	.9	6.2	.9	6.5	.9	6.8	1.0	7.0	1.0	7.3	1.1	00
10	5.8	.8	6.1	.8	6.4	.9	6.7	.9	7.0	1.0	7.2	1.0	7.5	1.0	7.9	1.1	8.2	1.2	8.5	1.2	9 50
20	6.6	.8	7.0	.9	7.3	.9	7.6	.9	7.9	.9	8.3	1.1	8.6	1.1	8.9	1.0	9.3	1.1	9.6	1.1	40
30	7.5	.9	7.9	.9	8.2	.9	8.5	.9	8.9	1.0	9.3	1.0	9.6	1.0	10.0	1.1	10.4	1.1	10.8	1.2	30
40	8.3	.8	8.7	.8	9.1	.9	9.5	1.0	10.0	1.1	10.4	1.1	10.8	1.2	11.2	1.2	11.6	1.2	12.0	1.2	20
50	9.2	.9	9.6	.9	10.0	.9	10.5	1.0	11.0	1.0	11.4	1.0	11.9	1.1	12.4	1.2	12.9	1.3	13.3	1.3	10
3 00	10.0	.8	10.5	.9	11.0	1.0	11.5	1.0	12.0	1.0	12.5	1.1	13.0	1.1	13.6	1.2	14.1	1.2	14.6	1.3	00
10	10.9	.9	11.4	.9	12.0	1.0	12.5	1.0	13.0	1.0	13.6	1.1	14.2	1.2	14.7	1.1	15.4	1.3	16.0	1.4	8 50
20	11.8	.9	12.4	1.0	13.0	1.0	13.5	1.0	14.1	1.1	14.7	1.1	15.3	1.1	15.9	1.2	16.6	1.2	17.3	1.3	40
30	12.6	.8	13.3	.9	13.9	.9	14.5	1.0	15.1	1.0	15.8	1.1	16.4	1.1	17.1	1.2	17.8	1.2	18.5	1.2	30
40	13.5	.9	14.2	.9	14.8	.9	15.5	1.0	16.1	1.0	16.8	1.0	17.5	1.1	18.2	1.1	19.0	1.2	19.7	1.2	20
50	14.3	.8	15.0	.8	15.7	.9	16.4	.9	17.1	1.0	17.8	1.0	18.5	1.0	19.4	1.2	20.1	1.1	20.9	1.2	10
4 00	15.1	.8	15.8	.8	16.5	.8	17.3	.9	18.1	1.0	18.8	1.0	19.6	1.1	20.4	1.0	21.2	1.1	22.0	1.1	00
10	15.9	.8	16.6	.8	17.3	.8	18.1	.8	19.0	.9	19.7	.9	20.6	1.0	21.4	1.0	22.3	1.1	23.1	1.1	7 50
20	16.6	.7	17.3	.7	18.1	.8	19.0	.9	19.8	.8	20.6	.9	21.5	.9	22.4	1.0	23.2	.9	24.1	1.0	40
30	17.2	.6	18.0	.7	18.8	.7	19.7	.7	20.5	.7	21.4	.8	22.3	.8	23.2	.8	24.1	.9	25.1	1.0	30
40	17.8	.6	18.6	.6	19.5	.7	20.3	.6	21.2	.7	22.1	.7	23.0	.7	24.0	.8	24.9	.8	25.9	.8	20
50	18.3	.5	19.2	.6	20.1	.6	21.0	.7	21.9	.7	22.8	.7	23.7	.7	24.6	.6	25.7	.8	26.7	.8	10
5 00	18.8	.5	19.7	.5	20.6	.5	21.5	.5	22.4	.5	23.4	.6	24.4	.7	25.3	.7	26.4	.7	27.4	.7	00
10	19.2	.4	20.1	.4	21.1	.5	22.0	.5	22.9	.5	23.9	.5	24.9	.5	25.8	.5	27.0	.6	28.0	.6	6 50
20	19.5	.3	20.5	.4	21.4	.3	22.4	.4	23.3	.4	24.3	.4	25.4	.5	26.2	.4	27.4	.4	28.5	.5	40
30	19.8	.3	20.7	.2	21.7	.3	22.6	.2	23.6	.3	24.6	.3	25.7	.3	26.6	.4	27.8	.4	28.8	.3	30
40	20.0	.2	20.9	.2	21.9	.2	22.8	.2	23.9	.3	24.9	.3	25.9	.2	26.9	.3	28.0	.2	29.1	.3	20
50	20.1	.1	21.0	.1	22.0	.1	23.0	.2	24.0	.1	25.0	.1	26.0	.1	27.0	.1	28.2	.2	29.3	.2	10
6 00	20.2	.1	21.1	.1	22.0	.0	23.1	.1	24.1	.1	25.1	.1	26.1	.1	27.1	.1	28.3	.1	29.4	.1	6 00

TABLE 28C.

[C=the 3d correction. Hor. Arg., the star's declination. Vert. Arg., B=the 2d correction.]

B.	88° 47′				88° 48′						88° 49′		
	20″	30″	40″	50″	0″	10″	20″	30″	40″	50″	0″	10″	20″
″	″	″	″	″	″	″	″	″	″	″	″	″	″
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	+0.2	+0.1	+0.1	+0.0	0.0	−0.0	−0.1	−0.1	−0.2	−0.2	−0.3	−0.4	−0.4
20	0.4	0.3	0.2	0.1	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
30	0.6	0.5	0.3	0.1	0.0	0.1	0.3	0.5	0.6	0.7	0.8	1.1	1.2
40	0.8	0.6	0.4	0.2	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.5	1.6
50	+1.0	+0.7	+0.5	+0.2	0.0	−0.2	−0.5	−0.7	−1.0	−1.2	−1.5	−1.7	−2.1

TABLE 28B.

For finding the Latitude of a place by Altitudes of Polaris.

[B = the 2d correction. This correction is always additive.]

Star's hour angle.	Star's altitude.																				Star's hour angle.
	34°		35°		36°		37°		38°		39°		40°		41°		42°		43°		
h. m.	″		″		″		″		″		″		″		″		″		″		h. m.
0 00	0.0	.1	0.0	.1	0.0	.1	0.0	.1	0.0	.1	0.0	.1	0.0	.1	0.0	.1	0.0	.1	0.0	.1	12 00
10	0.1	.1	0.1	.1	0.1	.1	0.1	.2	0.1	.2	0.1	.2	0.1	.2	0.1	.2	0.1	.2	0.1	.2	11 50
20	0.2	.3	0.2	.3	0.2	.3	0.3	.3	0.3	.3	0.3	.3	0.3	.3	0.3	.4	0.3	.4	0.3	.4	40
30	0.5	.4	0.5	.5	0.5	.5	0.6	.4	0.6	.5	0.6	.5	0.6	.5	0.7	.5	0.7	.5	0.7	.6	30
40	0.9	.6	1.0	.5	1.0	.5	1.0	.6	1.1	.5	1.1	.6	1.1	.7	1.2	.7	1.2	.7	1.3	.6	20
50	1.5	.5	1.5	.6	1.5	.7	1.6	.7	1.6	.7	1.7	.7	1.8	.7	1.9	.8	1.9	.9	1.9	.9	10
1 00	2.0	.8	2.1	.7	2.2	.8	2.3	.8	2.3	.9	2.4	.9	2.5	.9	2.7	.9	2.8	.9	2.8	1.0	00
10	2.8	.8	2.8	.9	3.0	.8	3.1	.9	3.2	.9	3.3	1.0	3.4	1.1	3.6	1.0	3.7	1.1	3.8	1.1	10 50
20	3.6	.9	3.7	.9	3.8	1.0	4.0	1.0	4.1	1.1	4.3	1.0	4.5	1.1	4.6	1.2	4.8	1.2	4.9	1.3	40
30	4.5	.9	4.6	1.0	4.8	1.0	5.0	1.1	5.2	1.1	5.3	1.3	5.6	1.2	5.8	1.2	6.0	1.3	6.2	1.3	30
40	5.4	1.1	5.6	1.1	5.8	1.2	6.1	1.2	6.3	1.2	6.6	1.2	6.8	1.3	7.0	1.3	7.3	1.4	7.5	1.5	20
50	6.5	1.1	6.7	1.2	7.0	1.2	7.3	1.2	7.5	1.3	7.8	1.4	8.1	1.4	8.3	1.5	8.7	1.5	9.0	1.5	10
2 00	7.6	1.2	7.9	1.3	8.2	1.3	8.5	1.3	8.8	1.4	9.2	1.4	9.5	1.4	9.8	1.5	10.2	1.5	10.5	1.6	00
10	8.8	1.2	9.2	1.3	9.5	1.3	9.8	1.4	10.2	1.5	10.6	1.5	10.9	1.6	11.3	1.7	11.7	1.7	12.1	1.8	9 50
20	10.0	1.3	10.5	1.2	10.8	1.3	11.2	1.4	11.7	1.4	12.1	1.5	12.5	1.6	13.0	1.6	13.4	1.7	13.9	1.9	40
30	11.3	1.3	11.7	1.4	12.1	1.5	12.6	1.5	13.1	1.5	13.6	1.5	14.1	1.6	14.6	1.6	15.1	1.7	15.6	1.8	30
40	12.6	1.3	13.1	1.3	13.6	1.4	14.1	1.5	14.6	1.5	15.1	1.6	15.7	1.6	16.2	1.8	16.8	1.7	17.4	1.9	20
50	13.9	1.3	14.4	1.5	15.0	1.4	15.6	1.4	16.1	1.6	16.7	1.6	17.3	1.7	18.0	1.7	18.5	1.8	19.3	1.8	10
3 00	15.2	1.4	15.9	1.4	16.4	1.5	17.0	1.5	17.7	1.5	18.3	1.6	19.0	1.7	19.7	1.7	20.3	1.8	21.1	1.8	00
10	16.6	1.3	17.3	1.3	17.9	1.4	18.5	1.5	19.2	1.5	19.9	1.6	20.7	1.6	21.4	1.7	22.1	1.8	22.9	1.9	8 50
20	17.9	1.3	18.6	1.3	19.3	1.4	20.0	1.5	20.7	1.6	21.5	1.6	22.3	1.6	23.1	1.6	23.9	1.7	24.8	1.7	40
30	19.2	1.3	19.9	1.3	20.7	1.3	21.5	1.3	22.3	1.4	23.1	1.5	23.9	1.5	24.7	1.7	25.6	1.7	26.5	1.8	30
40	20.5	1.2	21.2	1.3	22.0	1.4	22.8	1.4	23.7	1.4	24.6	1.5	25.4	1.6	26.4	1.5	27.3	1.7	28.3	1.7	20
50	21.7	1.1	22.5	1.2	23.4	1.2	24.2	1.4	25.1	1.4	26.1	1.4	27.0	1.4	27.9	1.6	29.0	1.5	30.0	1.7	10
4 00	22.8	1.2	23.7	1.2	24.6	1.2	25.6	1.2	26.5	1.3	27.5	1.3	28.4	1.5	29.5	1.4	30.5	1.6	31.7	1.5	00
10	24.0	1.0	24.9	1.1	25.8	1.2	26.8	1.2	27.8	1.2	28.8	1.3	29.9	1.3	30.9	1.4	32.1	1.4	33.2	1.5	7 50
20	25.0	1.1	26.0	1.1	27.0	1.0	28.0	1.1	29.0	1.1	30.1	1.2	31.2	1.2	32.3	1.2	33.5	1.2	34.7	1.3	40
30	26.1	.9	27.1	.8	28.0	1.0	29.1	1.0	30.1	1.1	31.3	1.0	32.4	1.1	33.5	1.2	34.7	1.3	36.0	1.3	30
40	27.0	.8	27.9	.9	29.0	.9	30.1	.9	31.2	1.0	32.3	1.0	33.5	.9	34.7	1.1	36.0	1.0	37.3	1.1	20
50	27.8	.6	28.8	.8	29.9	.8	31.0	.8	32.2	.8	33.3	.9	34.4	.9	35.8	.9	37.0	1.0	38.4	1.0	10
5 00	28.4	.7	29.6	.6	30.7	.6	31.8	.7	33.0	.7	34.2	.7	35.3	.8	36.7	.8	38.0	.8	39.4	.8	00
10	29.1	.5	30.2	.5	31.3	.5	32.5	.5	33.7	.6	34.9	.7	36.1	.7	37.5	.7	38.8	.7	40.2	.7	6 50
20	29.6	.4	30.7	.4	31.8	.5	33.0	.5	34.3	.4	35.6	.4	36.8	.5	38.2	.4	39.5	.5	40.9	.6	40
30	30.0	.3	31.1	.3	32.3	.3	33.5	.4	34.7	.4	36.0	.4	37.3	.3	38.6	.4	40.0	.4	41.5	.4	30
40	30.3	.2	31.4	.2	32.6	.2	33.9	.1	35.1	.1	36.4	.1	37.6	.2	39.0	.3	40.4	.3	41.9	.2	20
50	30.5	.0	31.6	.1	32.8	.1	34.0	.1	35.2	.1	36.5	.1	37.8	.1	39.3	.1	40.7	.1	42.1	.1	10
6 00	30.5		31.7		32.9		34.1		35.3		36.6		37.9		39.4		40.8		42.2		6 00

TABLE 28C.

[C = the 3d correction. Hor. Arg., the star's declination. Vert. Arg., B = the 2d correction.]

B.	88° 47′				88° 48′						88° 49′		
	20″	30″	40″	50″	0″	10″	20″	30″	40″	50″	0″	10″	20″
″	″	″	″	″	″	″	″	″	″	″	″	″	″
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	+0.2	+0.1	+0.1	+0.0	0.0	−0.0	−0.1	−0.1	−0.2	−0.2	−0.3	−0.4	−0.4
20	0.4	0.3	0.2	0.1	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
30	0.6	0.5	0.3	0.1	0.0	0.1	0.3	0.5	0.6	0.7	0.8	1.1	1.2
40	0.8	0.6	0.4	0.2	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.5	1.6
50	+1.0	+0.7	+0.5	+0.2	0.0	−0.2	−0.5	−0.7	−1.0	−1.2	−1.5	−1.7	−2.1

TABLE 28B.

For finding the Latitude of a place by Altitudes of Polaris.

[B=the 2d correction. This correction is always additive.]

Star's hour angle.	Star's altitude.																		Star's hour angle.
	44°		45°		46°		47°		48°		49°		50°		51°		52°		
h. m.	″		″		″		″		″		″		″		″		″		h. m.
0 00	0.0	.1	0.0	.1	0.0	.1	0.0	.1	0.0	.1	0.0	.1	0.0	.1	0.0	.1	0.0	.1	12 00
10	0.1	.2	0.1	.2	0.1	.2	0.1	.2	0.1	.3	0.1	.3	0.1	.3	0.1	.3	0.1	.3	11 50
20	0.3	.4	0.3	.4	0.3	.5	0.3	.5	0.4	.5	0.4	.5	0.4	.5	0.4	.6	0.4	.6	40
30	0.7	.6	0.7	.7	0.8	.6	0.8	.7	0.9	.6	0.9	.7	0.9	.7	1.0	.7	1.0	.8	30
40	1.3	.7	1.4	.7	1.4	.8	1.5	.8	1.5	.8	1.6	.8	1.6	.9	1.7	.9	1.8	1.0	20
50	2.0	.9	2.1	.9	2.2	1.0	2.3	.9	2.3	1.1	2.4	1.1	2.5	1.1	2.6	1.1	2.8	1.1	10
1 00	2.9	1.1	3.0	1.1	3.2	1.0	3.2	1.2	3.4	1.1	3.5	1.2	3.6	1.3	3.7	1.3	3.9	1.4	00
10	4.0	1.1	4.1	1.2	4.2	1.3	4.4	1.3	4.5	1.4	4.7	1.4	4.9	1.4	5.0	1.6	5.3	1.5	10 50
20	5.1	1.3	5.3	1.3	5.5	1.4	5.7	1.4	5.9	1.5	6.1	1.5	6.3	1.6	6.6	1.6	6.8	1.7	40
30	6.4	1.4	6.6	1.5	6.9	1.4	7.1	1.6	7.4	1.6	7.6	1.7	7.9	1.7	8.2	1.8	8.5	1.8	30
40	7.8	1.5	8.1	1.5	8.3	1.7	8.7	1.7	9.0	1.7	9.3	1.8	9.6	1.9	10.0	1.9	10.3	2.0	20
50	9.3	1.6	9.6	1.7	10.0	1.7	10.4	1.8	10.7	1.9	11.1	1.9	11.5	2.0	11.9	2.0	12.3	2.2	10
2 00	10.9	1.7	11.3	1.7	11.7	1.8	12.2	1.8	12.6	1.9	13.0	2.0	13.5	2.1	13.9	2.2	14.5	2.2	00
10	12.6	1.7	13.0	1.9	13.5	1.9	14.0	2.0	14.5	2.0	15.0	2.1	15.6	2.1	16.1	2.3	16.7	2.3	9 50
20	14.3	1.9	14.9	1.9	15.4	1.9	16.0	2.0	16.5	2.1	17.1	2.2	17.7	2.3	18.4	2.3	19.0	2.5	40
30	16.2	1.9	16.8	1.9	17.3	2.1	18.0	2.0	18.6	2.1	19.3	2.2	20.0	2.3	20.7	2.4	21.5	2.4	30
40	18.1	1.8	18.7	2.0	19.4	2.0	20.0	2.1	20.7	2.2	21.5	2.2	22.3	2.3	23.1	2.4	23.9	2.5	20
50	19.9	2.0	20.7	1.9	21.4	2.0	22.1	2.1	22.9	2.2	23.7	2.3	24.6	2.4	25.5	2.4	26.4	2.5	10
3 00	21.9	1.8	22.6	2.0	23.4	2.0	24.2	2.2	25.1	2.2	26.0	2.3	27.0	2.3	27.9	2.5	28.9	2.6	00
10	23.7	1.9	24.6	2.0	25.4	2.1	26.4	2.1	27.3	2.2	28.3	2.2	29.3	2.4	30.4	2.4	31.5	2.5	8 50
20	25.6	1.9	26.6	1.9	27.5	2.0	28.5	2.0	29.5	2.1	30.5	2.2	31.7	2.2	32.8	2.4	34.0	2.5	40
30	27.5	1.8	28.5	1.9	29.5	1.9	30.5	2.1	31.6	2.1	32.7	2.2	33.9	2.3	35.2	2.3	36.5	2.4	30
40	29.3	1.8	30.4	1.8	31.4	1.9	32.6	1.9	33.7	2.0	34.9	2.1	36.2	2.1	37.5	2.3	38.9	2.3	20
50	31.1	1.6	32.2	1.7	33.3	1.9	34.5	1.9	35.7	2.0	37.0	2.0	38.3	2.1	39.8	2.1	41.2	2.2	10
4 00	32.7	1.6	33.9	1.7	35.2	1.7	36.4	1.8	37.7	1.8	39.0	2.0	40.4	2.1	41.9	2.1	43.4	2.1	00
10	34.3	1.6	35.6	1.6	36.9	1.6	38.2	1.7	39.5	1.8	41.0	1.8	42.5	1.8	44.0	1.9	45.5	2.0	7 50
20	35.9	1.4	37.2	1.4	38.5	1.5	39.9	1.5	41.3	1.5	42.8	1.6	44.3	1.7	45.9	1.8	47.5	1.9	40
30	37.3	1.3	38.6	1.3	40.0	1.4	41.4	1.4	42.8	1.6	44.4	1.5	46.0	1.6	47.7	1.6	49.4	1.7	30
40	38.6	1.2	39.9	1.2	41.4	1.2	42.8	1.3	44.4	1.3	45.9	1.4	47.6	1.4	49.3	1.5	51.1	1.6	20
50	39.8	.9	41.1	1.1	42.6	1.1	44.1	1.2	45.7	1.2	47.3	1.3	49.0	1.3	50.8	1.3	52.7	1.3	10
5 00	40.7	.9	42.2	.9	43.7	.9	45.3	1.0	46.9	1.0	48.6	1.1	50.3	1.2	52.1	1.1	54.0	1.2	00
10	41.6	.8	43.1	.8	44.6	.8	46.3	.8	47.9	.8	49.7	.8	51.5	.9	53.2	1.0	55.2	.9	6 50
20	42.4	.5	43.9	.6	45.4	.7	47.1	.6	48.7	.7	50.5	.7	52.4	.7	54.2	.7	56.1	.8	40
30	42.9	.4	44.5	.4	46.1	.4	47.7	.4	49.4	.5	51.2	.5	53.1	.5	54.9	.6	56.9	.6	30
40	43.3	.3	44.9	.2	46.5	.2	48.1	.3	49.9	.2	51.7	.2	53.6	.3	55.5	.2	57.5	.3	20
50	43.6	.1	45.1	.2	46.7	.1	48.4	.1	50.1	.1	51.9	.2	53.9	.1	55.7	.2	57.8	.1	10
6 00	43.7		45.3		46.8		48.5		50.2		52.1		54.0		55.9		57.9		6 00

TABLE 28C.

[C=the 3d correction. Hor. Arg., the star's declination. Vert. Arg., B=the 2d correction.]

B.	88° 47′				88° 48′						88° 49′		
	20″	30″	40″	50″	0″	10″	20″	30″	40″	50″	0″	10″	20″
″	″	″	″	″	″	″	″	″	″	″	″	″	″
30	+0.6	+0.5	+0.3	+0.1	0.0	−0.1	−0.3	−0.5	−0.6	−0.7	−0.8	−1.1	−1.2
40	0.9	0.6	0.4	0.2	0.0	0.2	0.4	0.6	0.9	1.0	1.2	1.4	1.6
50	1.0	0.7	0.5	0.2	0.0	0.2	0.5	0.7	1.0	1.2	1.5	1.7	2.0
60	1.2	0.9	0.6	0.2	0.0	0.2	0.6	0.9	1.2	1.5	1.8	2.1	2.5
70	1.5	1.1	0.7	0.4	0.0	0.4	0.7	1.1	1.5	1.8	2.1	2.5	2.8
80	+1.6	+1.2	+0.8	+0.4	0.0	−0.4	−0.8	−1.2	−1.6	−2.1	−2.5	−2.8	−3.3

TABLE 28B.

For finding the Latitude of a place by Altitudes of Polaris.

[B = the 2d correction. This correction is always additive.]

Star's hour angle.	Star's altitude.																Star's hour angle.
	53°		54°		55°		56°		57°		58°		59°		60°		
h. m.	′ ″		′ ″		′ ″		′ ″		′ ″		′ ″		′ ″		′ ″		h. m.
0 00	0 0.0	0.1	0 0.0	0.1	0 0.0	0.1	0 0.0	0.2	0 0.0	0.2	0 0.0	0.2	0 0.0	0.2	0 0.0	0.2	12 00
10	0.1	0.4	0.1	0.4	0.1	0.4	0.2	0.3	0.2	0.3	0.2	0.4	0.2	0.4	0.2	0.4	11 50
20	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.7	0.6	0.6	0.6	0.7	0.6	0.7	40
30	1.0	0.8	1.0	0.8	1.1	0.8	1.1	0.9	1.2	0.9	1.2	1.0	1.3	0.9	1.3	1.0	30
40	1.8	1.0	1.8	1.1	1.9	1.1	2.0	1.1	2.1	1.1	2.2	1.2	2.2	1.3	2.3	1.3	20
50	2.8	1.2	2.9	1.3	3.0	1.3	3.1	1.4	3.2	1.5	3.4	1.5	3.5	1.5	3.6	1.7	10
1 00	4.0	1.4	4.2	1.4	4.3	1.5	4.5	1.6	4.7	1.6	4.9	1.7	5.0	1.8	5.3	1.8	00
10	0 5.4	1.6	0 5.6	1.7	0 5.8	1.7	0 6.1	1.8	0 6.3	1.9	0 6.6	1.8	0 6.8	2.0	0 7.1	2.0	10 50
20	7.0	1.8	7.3	1.8	7.5	2.0	7.9	1.9	8.2	2.0	8.4	2.2	8.8	2.2	9.1	2.4	40
30	8.8	1.9	9.1	2.0	9.5	2.0	9.8	2.1	10.2	2.3	10.6	2.4	11.0	2.4	11.5	2.5	30
40	10.7	2.1	11.1	2.2	11.5	2.3	11.9	2.4	12.5	2.3	13.0	2.5	13.4	2.6	14.0	2.7	20
50	12.8	2.2	13.3	2.3	13.8	2.3	14.3	2.5	14.8	2.6	15.5	2.6	16.0	2.8	16.7	2.9	10
2 00	15.0	2.3	15.6	2.4	16.1	2.5	16.8	2.5	17.4	2.7	18.1	2.7	18.8	2.9	19.6	3.0	00
10	0 17.3	2.4	0 18.0	2.5	0 18.6	2.7	0 19.3	2.8	0 20.1	2.8	0 20.8	3.0	0 21.7	3.1	0 22.6	3.2	9 50
20	19.7	2.5	20.5	2.6	21.3	2.7	22.1	2.8	22.9	2.9	23.8	3.0	24.8	3.1	25.8	3.3	40
30	22.2	2.6	23.1	2.6	24.0	2.7	24.9	2.8	25.8	3.0	26.8	3.1	27.9	3.2	29.1	3.3	30
40	24.8	2.6	25.7	2.7	26.7	2.8	27.7	2.9	28.8	3.0	29.9	3.1	31.1	3.2	32.4	3.4	20
50	27.4	2.7	28.4	2.7	29.5	2.8	30.6	2.9	31.8	3.0	33.0	3.2	34.3	3.3	35.8	3.4	10
3 00	30.1	2.5	31.1	2.7	32.3	2.8	33.5	3.0	34.8	3.1	36.2	3.2	37.6	3.3	39.2	3.4	00
10	0 32.6	2.6	0 33.8	2.7	0 35.1	2.8	0 36.5	2.9	0 37.9	3.0	0 39.4	3.1	0 40.9	3.3	0 42.6	3.4	8 50
20	35.2	2.6	36.5	2.7	37.9	2.8	39.4	2.8	40.9	2.9	42.5	3.1	44.2	3.2	46.0	3.3	40
30	37.8	2.5	39.2	2.6	40.7	2.6	42.2	2.8	43.8	2.9	45.6	3.0	47.4	3.1	49.3	3.3	30
40	40.3	2.4	41.8	2.5	43.3	2.6	45.0	2.7	46.7	2.9	48.6	2.9	50.5	3.0	52.6	3.1	20
50	42.7	2.3	44.3	2.4	45.9	2.5	47.7	2.6	49.6	2.6	51.5	2.8	53.5	2.9	55.7	3.1	10
4 00	45.0	2.2	46.7	2.3	48.4	2.4	50.3	2.5	52.2	2.6	54.3	2.6	56.4	2.8	58.8	2.8	00
10	0 47.2	2.1	0 49.0	2.1	0 50.8	2.3	0 52.8	2.3	0 54.8	2.4	0 56.9	2.5	0 59.2	2.7	1 1.6	2.8	7 50
20	49.3	2.0	51.1	2.0	53.1	2.1	55.1	2.2	57.2	2.3	59.4	2.4	1 1.9	2.4	1 4.4	2.5	40
30	51.3	1.8	53.1	1.9	55.2	1.9	57.3	1.9	59.5	2.1	1 1.8	2.1	1 4.3	2.2	1 6.9	2.3	30
40	53.1	1.5	55.0	1.6	57.1	1.7	59.2	1.8	1 1.6	1.8	1 3.9	2.0	1 6.5	2.0	1 9.2	2.1	20
50	54.6	1.5	56.6	1.5	58.8	1.5	1 1.0	1.6	1 3.4	1.6	1 5.9	1.7	1 8.5	1.8	1 11.3	1.8	10
5 00	56.1	1.2	58.1	1.3	1 0.3	1.3	1 2.6	1.3	1 5.0	1.4	1 7.6	1.4	1 10.3	1.5	1 13.1	1.6	00
10	0 57.3	0.9	0 59.4	1.0	1 1.6	1.1	1 3.9	1.1	1 6.4	1.2	1 9.0	1.2	1 11.8	1.3	1 14.7	1.4	6 50
20	58.2	0.8	1 0.4	0.8	1 2.7	0.8	1 5.0	0.9	1 7.6	0.9	1 10.2	1.0	1 13.1	0.9	1 16.1	0.9	40
30	59.0	0.6	1 1.2	0.6	1 3.5	0.7	1 5.9	0.7	1 8.5	0.7	1 11.2	0.6	1 14.0	0.8	1 17.0	0.8	30
40	59.6	0.3	1 1.8	0.3	1 4.2	0.3	1 6.6	0.4	1 9.2	0.4	1 11.8	0.4	1 14.8	0.4	1 17.8	0.4	20
50	59.9	0.1	1 2.1	0.2	1 4.5	0.2	1 7.0	0.1	1 9.6	0.1	1 12.2	0.2	1 15.2	0.2	1 18.2	0.2	10
6 00	1 0.0		1 2.3		1 4.7		1 7.1		1 9.7		1 12.4		1 15.4		1 18.4		6 00

TABLE 28C.

[C = the 3d correction. Hor. Arg., the star's declination. Vert. Arg., B = the 2d correction.]

B.	88° 47′				88° 48′						88° 49′		
	20″	30″	40″	50″	0″	10″	20″	30″	40″	50″	0″	10″	20″
″	″	″	″	″	″	″	″	″	″	″	″	″	″
30	+0.6	+0.5	+0.3	+0.1	0.0	−0.1	−0.3	−0.5	−0.6	−0.7	−0.8	−1.1	−1.2
40	0.9	0.6	0.4	0.2	0.0	0.2	0.4	0.6	0.9	1.0	1.2	1.4	1.6
50	1.0	0.7	0.5	0.2	0.0	0.2	0.5	0.7	1.0	1.2	1.5	1.7	2.0
60	1.2	0.9	0.6	0.2	0.0	0.2	0.6	0.9	1.2	1.5	1.8	2.1	2.5
70	1.5	1.1	0.7	0.4	0.0	0.4	0.7	1.1	1.5	1.8	2.1	2.5	2.8
80	+1.6	+1.2	+0.8	+0.4	0.0	−0.4	−0.8	−1.2	−1.6	−2.1	−2.5	−2.8	−3.3

TABLE 28D.

For finding the Latitude of a place by Altitudes of Polaris.

[D = the 4th correction. (D has the same sign as A when the Dec. <88° 48′, the opposite sign when the Dec. >88° 48′.)]

[Vertical Argument, A = the 1st correction. Horizontal Argument, the star's declination.]

A.	Declination, 88° 47′								88° 48′						Proportional parts.			
	20″	25″	30″	35″	40″	45″	50″	55″	0″	5″	10″	15″	20″	25″	1″	2″	3″	4″
′	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1.1	1.0	0.8	0.7	0.6	0.4	0.2	0.1	0.0	0.1	0.2	0.4	0.6	0.7	0.0	0.0	0.1	0.1
4	2.2	1.9	1.7	1.4	1.1	0.8	0.6	0.3	0.0	0.3	0.6	0.8	1.1	1.4	0.1	0.1	0.2	0.2
6	3.3	2.9	2.5	2.1	1.7	1.2	0.8	0.4	0.0	0.4	0.8	1.2	1.7	2.1	0.1	0.2	0.2	0.3
8	4.4	3.9	3.3	2.8	2.2	1.7	1.1	0.6	0.0	0.6	1.1	1.7	2.2	2.8	0.1	0.2	0.3	0.4
10	5.6	4.9	4.2	3.4	2.8	2.1	1.4	0.7	0.0	0.7	1.4	2.1	2.8	3.4	0.1	0.3	0.4	0.6
12	6.7	5.8	5.0	4.2	3.3	2.5	1.7	0.8	0.0	0.8	1.7	2.5	3.3	4.1	0.2	0.3	0.5	0.6
14	7.8	6.8	5.8	4.9	3.9	2.9	1.9	1.0	0.0	1.0	1.9	2.9	3.9	4.9	0.2	0.4	0.6	0.8
16	8.9	7.8	6.7	5.5	4.4	3.3	2.2	1.1	0.0	1.1	2.2	3.3	4.4	5.5	0.2	0.4	0.7	0.9
18	10.0	8.8	7.5	6.2	5.0	3.8	2.5	1.2	0.0	1.2	2.5	3.8	5.0	6.2	0.2	0.5	0.7	1.0
20	11.1	9.7	8.3	6.9	5.5	4.2	2.8	1.4	0.0	1.4	2.8	4.2	5.5	6.9	0.3	0.6	0.8	1.1
22	12.2	10.7	9.2	7.7	6.1	4.6	3.0	1.6	0.0	1.6	3.0	4.6	6.1	7.7	0.3	0.6	0.9	1.3
24	13.3	11.7	10.0	8.3	6.7	5.0	3.3	1.7	0.0	1.7	3.3	5.0	6.7	8.3	0.3	0.7	1.0	1.4
26	14.4	12.7	10.8	9.0	7.2	5.4	3.6	1.8	0.0	1.8	3.6	5.4	7.2	9.0	0.4	0.7	1.1	1.4
28	15.6	13.6	11.7	9.7	7.8	5.8	3.9	1.9	0.0	1.9	3.9	5.8	7.8	9.7	0.4	0.8	1.1	1.5
30	16.7	14.6	12.5	10.4	8.3	6.2	4.2	2.1	0.0	2.1	4.2	6.2	8.3	10.4	0.4	0.8	1.3	1.7
32	17.8	15.6	13.3	11.1	8.9	6.7	4.4	2.2	0.0	2.2	4.4	6.7	8.9	11.1	0.4	0.9	1.3	1.8
34	18.9	16.6	14.2	11.8	9.4	7.1	4.7	2.3	0.0	2.3	4.7	7.1	9.4	11.8	0.5	0.9	1.4	1.9
36	20.0	17.5	15.0	12.5	10.0	7.5	5.0	2.5	0.0	2.5	5.0	7.5	10.0	12.5	0.5	1.0	1.5	2.0
38	21.1	18.4	15.8	13.2	10.6	7.9	5.3	2.7	0.0	2.7	5.3	7.9	10.6	13.2	0.5	1.1	1.6	2.1
40	22.2	19.4	16.7	13.9	11.1	8.3	5.6	2.8	0.0	2.8	5.6	8.3	11.1	13.9	0.6	1.1	1.7	2.2
42	23.3	20.4	17.6	14.6	11.7	8.8	5.8	2.9	0.0	2.9	5.8	8.8	11.7	14.6	0.6	1.2	1.7	2.3
44	24.4	21.4	18.3	15.3	12.2	9.2	6.1	3.0	0.0	3.0	6.1	9.2	12.2	15.3	0.6	1.2	1.8	2.4
46	25.6	22.3	19.2	16.0	12.8	9.6	6.4	3.2	0.0	3.2	6.4	9.6	12.8	16.0	0.6	1.3	1.9	2.6
48	26.7	23.3	20.0	16.7	13.3	10.0	6.7	3.3	0.0	3.3	6.7	10.0	13.3	16.7	0.7	1.3	2.0	2.6
50	27.8	24.3	20.8	17.3	13.9	10.4	6.9	3.4	0.0	3.4	6.9	10.4	13.9	17.3	0.7	1.4	2.1	2.8
52	28.9	25.3	21.7	18.0	14.4	10.8	7.2	3.6	0.0	3.6	7.2	10.8	14.4	18.0	0.7	1.4	2.2	2.9
54	30.0	26.2	22.5	18.8	15.0	11.2	7.5	3.8	0.0	3.8	7.5	11.2	15.0	18.8	0.7	1.5	2.2	3.0
56	31.1	27.2	23.3	19.4	15.6	11.7	7.8	3.9	0.0	3.9	7.8	11.7	15.6	19.4	0.8	1.6	2.3	3.1
58	32.2	28.2	24.2	20.1	16.1	12.1	8.0	4.0	0.0	4.0	8.0	12.1	16.1	20.1	0.8	1.6	2.4	3.2
60	33.3	29.2	25.0	20.8	16.7	12.5	8.3	4.2	0.0	4.2	8.3	12.5	16.7	20.8	0.8	1.7	2.5	3.3
62	34.4	30.1	25.8	21.5	17.2	12.9	8.6	4.3	0.0	4.3	8.6	12.9	17.2	21.5	0.9	1.7	2.6	3.4
64	35.6	31.1	26.7	22.2	17.8	13.3	8.9	4.4	0.0	4.4	8.9	13.3	17.8	22.2	0.9	1.8	2.7	3.6
66	36.7	32.1	27.5	22.9	18.3	13.8	9.2	4.6	0.0	4.6	9.2	13.8	18.3	22.9	0.9	1.8	2.8	3.7
68	37.8	33.0	28.3	23.6	18.9	14.2	9.4	4.7	0.0	4.7	9.4	14.2	18.9	23.6	0.9	1.9	2.8	3.8
70	38.9	34.0	29.2	24.3	19.4	14.6	9.7	4.9	0.0	4.9	9.7	14.6	19.4	24.3	1.0	1.9	2.9	3.9
72	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	0.0	5.0	10.0	15.0	20.0	25.0	1.0	2.0	3.0	4.0
	Proportional parts.																	
′ ″	″	″	″	″	″	″	″	″	″	″	″	″	″	″				
0 20	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1				
0 40	0.4	0.3	0.3	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2				
1 00	0.6	0.5	0.4	0.4	0.3	0.2	0.1	0.1	0.0	0.1	0.1	0.2	0.3	0.4				
1 20	0.7	0.7	0.5	0.5	0.4	0.2	0.1	0.1	0.0	0.1	0.1	0.2	0.4	0.5				
1 40	0.9	0.8	0.7	0.6	0.5	0.3	0.2	0.1	0.0	0.1	0.2	0.3	0.5	0.6				
2 00	1.1	1.0	0.8	0.7	0.6	0.4	0.2	0.1	0.0	0.1	0.2	0.4	0.6	0.7				

TABLE 28D.

For finding the Latitude of a place by Altitudes of Polaris.

[D=the 4th correction. (D has the same sign as A when the Dec. <88° 48′, the opposite sign when the Dec. >88° 48′.)]

[Vertical Argument A=the 1st correction. Horizontal Argument, the star's declination.]

A.	Declination, 88° 48′						88° 49′					Proportional parts.			
	30″	35″	40″	45″	50″	55″	0″	5″	10″	15″	20″	1″	2″	3″	4″
′	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.8	1.0	1.1	1.2	1.4	1.6	1.7	1.8	1.9	2.1	2.2	0.0	0.1	0.1	0.1
4	1.7	1.9	2.2	2.5	2.8	3.1	3.3	3.6	3.9	4.2	4.4	0.1	0.1	0.1	0.2
6	2.5	2.9	3.3	3.8	4.2	4.6	5.0	5.3	5.8	6.2	6.7	0.1	0.2	0.2	0.3
8	3.3	3.9	4.4	5.0	5.6	6.1	6.7	7.2	7.8	8.3	8.9	0.1	0.2	0.3	0.4
10	4.2	4.9	5.6	6.2	6.9	7.6	8.3	9.0	9.7	10.4	11.1	0.1	0.3	0.4	0.6
12	5.0	5.8	6.7	7.5	8.3	9.2	10.0	10.8	11.7	12.5	13.3	0.2	0.3	0.5	0.7
14	5.8	6.8	7.8	8.8	9.8	10.8	11.8	12.7	13.7	14.6	15.6	0.2	0.4	0.6	0.8
16	6.7	7.8	8.9	10.0	11.1	12.2	13.3	14.4	15.6	16.7	17.8	0.2	0.4	0.7	0.9
18	7.5	8.8	10.0	11.2	12.5	13.8	15.0	16.2	17.5	18.8	20.0	0.2	0.5	0.7	1.0
20	8.3	9.7	11.1	12.5	13.9	15.3	16.7	18.1	19.4	20.9	22.2	0.3	0.6	0.8	1.1
22	9.2	10.7	12.2	13.8	15.3	16.8	18.3	19.8	21.4	22.9	24.4	0.3	0.6	1.0	1.3
24	10.0	11.7	13.3	15.0	16.7	18.4	20.0	21.7	23.3	25.0	26.7	0.3	0.7	1.0	1.4
26	10.8	12.7	14.4	16.2	18.0	19.9	21.7	23.5	25.3	27.1	28.9	0.4	0.7	1.1	1.4
28	11.7	13.6	15.6	17.5	19.4	21.4	23.3	25.3	27.2	29.2	31.1	0.4	0.8	1.2	1.6
30	12.5	14.6	16.7	18.8	20.8	22.9	25.0	27.1	29.2	31.2	33.3	0.4	0.8	1.2	1.6
32	13.3	15.6	17.8	20.0	22.2	24.4	26.7	28.9	31.1	33.3	35.5	0.4	0.9	1.3	1.8
34	14.2	16.6	18.9	21.2	23.6	26.0	28.4	30.7	33.1	35.4	37.8	0.5	0.9	1.4	1.9
36	15.0	17.5	20.0	22.5	25.0	27.5	30.0	32.5	35.0	37.5	40.0	0.5	1.0	1.5	2.0
38	15.8	18.4	21.1	23.8	26.4	29.0	31.6	34.2	37.0	39.6	42.2	0.5	1.1	1.6	2.2
40	16.7	19.4	22.2	25.0	27.8	30.6	33.3	36.1	38.9	41.7	44.4	0.6	1.1	1.7	2.2
42	17.6	20.4	23.3	26.2	29.2	32.1	35.0	37.9	40.8	43.8	46.7	0.6	1.2	1.8	2.4
44	18.3	21.4	24.4	27.5	30.6	33.7	36.8	39.8	42.8	45.9	48.9	0.6	1.2	1.8	2.4
46	19.2	22.3	25.6	28.8	32.0	35.1	38.3	41.5	44.8	47.9	51.1	0.6	1.3	1.9	2.6
48	20.0	23.3	26.7	30.0	33.3	36.7	40.0	43.3	46.7	50.0	53.3	0.7	1.3	2.0	2.7
50	20.8	24.3	27.8	31.2	34.7	38.2	41.7	45.1	48.6	52.1	55.5	0.7	1.4	2.1	2.8
52	21.7	25.3	28.9	32.5	36.1	39.7	43.3	46.9	50.5	54.2	57.8	0.7	1.4	2.2	2.9
54	22.5	26.2	30.0	33.8	37.5	41.2	45.0	48.7	52.5	56.2	60.0	0.7	1.5	2.2	3.0
56	23.3	27.2	31.1	35.0	38.9	42.8	46.7	50.5	54.4	58.3	62.2	0.8	1.6	2.3	3.1
58	24.2	28.2	32.2	36.2	40.3	44.3	48.3	52.3	56.4	60.4	64.4	0.8	1.6	2.4	3.2
60	25.0	29.2	33.3	37.5	41.7	45.9	50.0	54.2	58.3	62.5	66.7	0.8	1.7	2.5	3.3
62	25.8	30.1	34.4	38.8	43.0	47.3	51.7	56.0	60.3	64.6	68.9	0.9	1.7	2.6	3.4
64	26.7	31.1	35.6	40.0	44.4	48.9	53.3	57.8	62.2	66.7	71.1	0.9	1.8	2.7	3.6
66	27.5	32.1	36.7	41.2	45.8	50.4	55.0	59.6	64.2	68.8	73.3	0.9	1.8	2.7	3.6
68	28.3	33.0	37.8	42.5	47.2	52.0	56.7	61.3	66.1	70.9	75.5	0.9	1.9	2.8	3.8
70	29.2	34.0	38.9	43.8	48.6	53.5	58.3	63.1	68.0	72.9	77.7	1.0	1.9	2.9	3.9
72	30.0	35.0	40.0	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	1.0	2.0	3.0	4.0
	Proportional parts.														
′ ″	″	″	″	″	″	″	″	″	″	″	″				
0 20	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4				
0 40	0.2	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.7	0.7				
1 00	0.4	0.5	0.6	0.6	0.7	0.8	0.8	0.9	0.9	1.0	1.1				
1 20	0.5	0.7	0.7	0.8	0.9	1.1	1.1	1.2	1.3	1.4	1.5				
1 40	0.6	0.8	0.9	1.0	1.1	1.3	1.4	1.5	1.6	1.7	1.8				
2 00	0.8	1.0	1.1	1.2	1.4	1.6	1.7	1.8	1.9	2.1	2.2				

TABLE 29.

Conversion Tables for Nautical and Statute Miles.

Nautical miles into statute miles.

1 nautical mile or knot = 6,080 feet.
1 statute mile = 5,280 feet.

Nautical miles.	Statute miles.	Nautical miles.	Statute miles.	Nautical miles.	Statute miles.
1.00	1.151	8.75	10.075	16.50	18.999
1.25	1.439	9.00	10.363	16.75	19.287
1.50	1.727	9.25	10.651	17.00	19.575
1.75	2.015	9.50	10.939	17.25	19.863
2.00	2.303	9.75	11.227	17.50	20.151
2.25	2.590	10.00	11.515	17.75	20.439
2.50	2.878	10.25	11.803	18.00	20.727
2.75	3.166	10.50	12.090	18.25	21.015
3.00	3.454	10.75	12.378	18.50	21.303
3.25	3.742	11.00	12.666	18.75	21.590
3.50	4.030	11.25	12.954	19.00	21.878
3.75	4.318	11.50	13.242	19.25	22.166
4.00	4.606	11.75	13.530	19.50	22.454
4.25	4.893	12.00	13.818	19.75	22.742
4.50	5.181	12.25	14.106	20.00	23.030
4.75	5.469	12.50	14.393	20.25	23.318
5.00	5.757	12.75	14.681	20.50	23.606
5.25	6.045	13.00	14.969	20.75	23.893
5.50	6.333	13.25	15.257	21.00	24.181
5.75	6.621	13.50	15.545	21.25	24.469
6.00	6.909	13.75	15.833	21.50	24.757
6.25	7.196	14.00	16.121	21.75	25.045
6.50	7.484	14.25	16.409	22.00	25.333
6.75	7.772	14.50	16.696	22.25	25.621
7.00	8.060	14.75	16.984	22.50	25.909
7.25	8.348	15.00	17.272	22.75	26.196
7.50	8.636	15.25	17.560	23.00	26.484
7.75	8.924	15.50	17.848	23.50	27.060
8.00	9.212	15.75	18.136	24.00	27.636
8.25	9.500	16.00	18.424	24.50	28.212
8.50	9.787	16.25	18.712	25.00	28.787

Statute miles into nautical miles.

1 statute mile = 5,280 feet.
1 nautical mile or knot = 6,080 feet.

Statute miles.	Nautical miles.	Statute miles.	Nautical miles.	Statute miles.	Nautical miles.
1.00	0.868	9.00	7.815	17.00	14.763
1.25	1.085	9.25	8.032	17.25	14.980
1.50	1.302	9.50	8.249	17.50	15.197
1.75	1.519	9.75	8.467	17.75	15.414
2.00	1.736	10.00	8.684	18.00	15.632
2.25	1.953	10.25	8.901	18.25	15.849
2.50	2.170	10.50	9.118	18.50	16.066
2.75	2.387	10.75	9.335	18.75	16.283
3.00	2.604	11.00	9.552	19.00	16.500
3.25	2.821	11.25	9.769	19.25	16.717
3.50	3.038	11.50	9.986	19.50	16.934
3.75	3.256	11.75	10.203	19.75	17.151
4.00	3.473	12.00	10.420	20.00	17.369
4.25	3.690	12.25	10.638	20.25	17.586
4.50	3.907	12.50	10.855	20.50	17.803
4.75	4.124	12.75	11.072	20.75	18.020
5.00	4.341	13.00	11.289	21.00	18.237
5.25	4.559	13.25	11.507	21.25	18.454
5.50	4.776	13.50	11.724	21.50	18.671
5.75	4.994	13.75	11.941	21.75	18.888
6.00	5.211	14.00	12.158	22.00	19.105
6.25	5.428	14.25	12.376	22.25	19.322
6.50	5.645	14.50	12.593	22.50	19.539
6.75	5.862	14.75	12.810	22.75	19.756
7.00	6.079	15.00	13.027	23.00	19.973
7.25	6.296	15.25	13.244	23.25	20.191
7.50	6.513	15.50	13.461	23.50	20.408
7.75	6.730	15.75	13.678	23.75	20.625
8.00	6.947	16.00	13.895	24.00	20.842
8.25	7.164	16.25	14.112	24.25	21.060
8.50	7.381	16.50	14.329	24.50	21.277
8.75	7.598	16.75	14.546	25.00	21.711

TABLE 30.

Conversion Tables for Metric and English Linear Measure.

Metric to English.

Meters.	Feet.	Yards.	Statute miles.	Nautical miles.
1	3.280 833 3	1.093 611 1	0.000 621 369	0.000 539 593
2	6.561 666 7	2.187 222 2	.001 242 738	.001 079 185
3	9.842 500 0	3.280 833 3	.001 864 106	.001 618 778
4	13.123 333 3	4.374 444 4	.002 485 475	.002 158 370
5	16.404 166 7	5.468 055 6	.003 106 844	.002 697 963
6	19.685 000 0	6.561 666 7	.003 728 213	.003 237 556
7	22.965 833 3	7.655 277 8	.004 349 582	.003 777 148
8	26.246 666 7	8.748 888 9	.004 970 950	.004 316 741
9	29.527 500 0	9.842 500 0	.005 592 319	.004 856 333

English to metric.

No.	Feet to meters.	Yards to meters.	Statute miles to meters.	Nautical miles to meters.
1	0.304 800 6	0.914 401 8	1,609.35	1,853.25
2	0.609 601 2	1.828 803 7	3,218.70	3,706.50
3	0.914 401 8	2.743 205 5	4,828.05	5,559.75
4	1.219 202 4	3.657 607 .3	6,437.40	7,413.00
5	1.524 003 0	4.572 009 1	8,046.75	9,266.25
6	1.828 803 7	5.486 411 0	9,656.10	11,119.50
7	2.133 604 3	6.400 812 8	11,265.45	12,972.75
8	2.438 404 9	7.315 214 6	12,874.80	14,826.00
9	2.743 205 5	8.229 616 5	14,484.15	16,679.25

TABLE 31.

Conversion Tables for Thermometer Scales.

[F°=Fahrenheit temperature; C°=Centigrade temperature; R°=Réaumur temperature.]

Equivalent temperatures—Fahr., Cent., Réau

$$R° = \tfrac{4}{5}\,C° = \tfrac{4}{9}\,(F° - 32°).$$
$$C° = \tfrac{5}{4}\,R° = \tfrac{5}{9}\,(F° - 32°).$$

F°.	C°.	R°.	F°.	C°.	R°.
1	−17.2	−13.8	51	+10.6	+ 8.4
2	16.7	13.3	52	11.1	8.9
3	16.1	12.9	53	11.7	9.3
4	15.6	12.4	54	12.2	9.8
5	15.0	12.0	55	12.8	10.2
6	14.4	11.6	56	13.3	10.7
7	13.9	11.1	57	13.9	11.1
8	13.3	10.7	58	14.4	11.6
9	12.8	10.2	59	15.0	12.0
10	12.2	9.8	60	15.6	12.4
11	11.7	9.3	61	16.1	12.9
12	11.1	8.9	62	16.7	13.3
13	10.6	8.4	63	17.2	13.8
14	10.0	8.0	64	17.8	14.2
15	9.4	7.6	65	18.3	14.7
16	8.9	7.1	66	18.9	15.1
17	8.3	6.7	67	19.4	15.6
18	7.8	6.2	68	20.0	16.0
19	7.2	5.8	69	20.6	16.4
20	6.7	5.3	70	21.1	16.9
21	6.1	4.9	71	21.7	17.3
22	5.6	4.4	72	22.2	17.8
23	5.0	4.0	73	22.8	18.2
24	4.4	3.6	74	23.3	18.7
25	3.9	3.1	75	23.9	19.1
26	3.3	2.7	76	24.4	19.6
27	2.8	2.2	77	25.0	20.0
28	2.2	1.8	78	25.6	20.4
29	1.7	1.3	79	26.1	20.9
30	1.1	0.9	80	26.7	21.3
31	− 0.6	− 0.4	81	27.2	21.8
32	0.0	0.0	82	27.8	22.2
33	+ 0.6	+ 0.4	83	28.3	22.7
34	1.1	0.9	84	28.9	23.1
35	1.7	1.3	85	29.4	23.6
36	2.2	1.8	86	30.0	24.0
37	2.8	2.2	87	30.6	24.4
38	3.3	2.7	88	31.1	24.9
39	3.9	3.1	89	31.7	25.3
40	4.4	3.6	90	32.2	25.8
41	5.0	4.0	91	32.8	26.2
42	5.6	4.4	92	33.3	26.7
43	6.1	4.9	93	33.9	27.1
44	6.7	5.3	94	34.4	27.6
45	7.2	5.8	95	35.0	28.0
46	7.8	6.2	96	35.6	28.4
47	8.3	6.7	97	36.1	28.9
48	8.9	7.1	98	36.7	29.3
49	9.4	7.6	99	37.2	29.8
50	+10.0	+ 8.0	100	+37.8	+30.2

Equivalent temperatures—Centigrade and Fahrenheit.

$$F° = \tfrac{9}{5}\,C° + 32°.$$

C°.	F°.	C°.	F°.	C°.	F°.	C°.	F°.	C°.	F°.
−10	14.0	0	32.0	10	50.0	20	68.0	30	86.0
− 9	15.8	1	33.8	11	51.8	21	69.8	31	87.8
− 8	17.6	2	35.6	12	53.6	22	71.6	32	89.6
− 7	19.4	3	37.4	13	55.4	23	73.4	33	91.4
− 6	21.2	4	39.2	14	57.2	24	75.2	34	93.2
− 5	23.0	5	41.0	15	59.0	25	77.0	35	95.0
− 4	24.8	6	42.8	16	60.8	26	78.8	36	96.8
− 3	26.6	7	44.6	17	62.6	27	80.6	37	98.6
− 2	28.4	8	46.4	18	64.4	28	82.4	38	100.4
− 1	30.2	9	48.2	19	66.2	29	84.2	39	102.2

Equivalent temperatures—Réaumur and Fahrenheit.

$$F° = \tfrac{9}{4}\,R° + 32°.$$

R°.	F°.	R°.	F°.	R°.	F°.	R°.	F°.
−10	9.5	0	32.0	10	54.5	20	77.0
− 9	11.8	1	34.2	11	56.8	21	79.2
− 8	14.0	2	36.5	12	59.0	22	81.5
− 7	16.2	3	38.8	13	61.2	23	83.8
− 6	18.5	4	41.0	14	63.5	24	86.0
− 5	20.8	5	43.2	15	65.8	25	88.2
− 4	23.0	6	45.5	16	68.0	26	90.5
− 3	25.2	7	47.8	17	70.2	27	92.8
− 2	27.5	8	50.0	18	72.5	28	95.0
− 1	29.8	9	52.2	19	74.8	29	97.2

TABLE 32.

To obtain the True Force and Direction of the Wind from its Apparent Force and Direction on a Moving Vessel.

Apparent force of the wind (Beaufort scale).	Speed of vessel, knots.	Apparent direction of the wind (points off the bow).																	
		0		1		2		3		4		5		6		7		8	
		True direction, points off the bow.	True force, Beaufort scale.	True direction, points off the bow.	True force, Beaufort scale.	True direction, points off the bow.	True force, Beaufort scale.	True direction, points off the bow.	True force, Beaufort scale.	True direction, points off the bow.	True force, Beaufort scale.	True direction, points off the bow.	True force, Beaufort scale.	True direction, points off the bow.	True force, Beaufort scale.	True direction, points off the bow.	True force, Beaufort scale.	True direction, points off the bow.	True force, Beaufort scale.
0	10	16	1	16	1	15	1	15	1	16	1	15	1	15	2	15	2	15	2
	15	16	2	16	2	16	2	15	2	15	2	15	2	15	3	15	3	15	3
	20	16	3	16	3	16	3	16	4	15	4	15	4	15	4	16	4	15	4
1	10	16	0	14	0	13	0	12	1	12	1	12	1	12	2	13	2	13	2
	15	16	1	15	1	14	2	14	2	14	2	14	2	14	3	14	3	14	3
	20	16	2	15	2	15	3	15	3	14	3	14	3	14	4	14	4	14	4
2	10	0	0	6	0	7	0	8	1	9	1	10	2	10	2	11	3	12	3
	15	16	0	13	0	12	1	12	1	12	2	12	2	12	3	12	3	13	4
	20	16	1	15	2	14	2	13	2	13	3	13	3	13	4	13	4	13	5
3	10	0	1	3	1	5	1	6	2	8	2	8	2	9	3	10	3	11	4
	15	0	0	8	0	8	1	9	1	10	2	10	3	11	3	11	4	12	4
	20	16	0	13	1	12	1	12	2	12	3	12	3	12	4	12	5	13	5
4	10	0	2	2	2	4	2	6	2	7	3	8	3	9	4	10	4	10	4
	15	0	1	4	1	6	1	7	2	8	3	9	3	10	4	11	5	11	5
	20	.....	0	9	0	9	1	10	2	10	3	10	4	11	4	12	5	12	5
5	10	0	3	2	3	3	3	5	3	6	4	7	4	8	5	9	5	10	5
	15	0	2	3	2	5	2	6	3	7	3	8	4	9	5	10	5	11	6
	20	0	0	5	1	7	2	8	3	9	3	10	3	10	5	11	6	12	6
6	10	0	4	2	4	3	4	4	4	6	5	7	5	8	6	9	6	10	6
	15	0	3	2	3	4	3	5	4	7	4	8	5	9	6	10	6	10	7
	20	0	2	3	2	5	2	7	3	8	4	9	5	10	6	10	7	11	7
7	10	0	5	1	5	3	5	4	6	5	6	6	6	7	7	8	7	9	7
	15	0	4	2	4	3	4	5	5	6	5	7	6	8	6	9	7	10	7
	20	0	3	2	3	4	4	6	4	7	5	8	6	9	7	10	7	11	8
8	10	0	6	1	6	3	7	4	7	5	7	6	7	7	8	8	8	9	8
	15	0	5	2	6	3	6	4	6	6	7	7	7	8	8	9	8	10	8
	20	0	4	2	5	4	5	5	6	6	6	8	7	9	8	9	8	10	9
9	10	0	8	1	8	2	8	4	8	5	8	6	8	7	9	8	9	9	9
	15	0	7	1	7	3	7	4	7	5	8	6	8	8	8	9	9	10	9
	20	0	6	2	6	3	6	5	7	6	7	7	8	8	8	9	8	10	9
10	10	0	9	1	9	2	9	4	9	5	9	6	9	7	10	8	10	9	10
	15	0	8	1	8	3	8	4	8	5	9	6	9	7	9	8	10	9	10
	20	0	7	2	7	3	8	4	8	6	8	7	9	8	9	9	10	10	10
11	10	0	10	1	10	2	10	4	10	5	10	6	10	7	11	8	11	9	11
	15	0	9	1	9	3	9	4	10	5	10	6	10	7	11	8	11	9	11
	20	0	9	1	9	3	9	4	9	5	10	7	10	8	10	9	11	10	11
12	10	0	11	1	11	2	11	3	11	4	11	6	12	7	12	8	12	9	12
	15	0	11	1	11	2	11	4	11	5	11	6	11	7	12	8	12	9	12
	20	0	10	1	10	3	10	4	11	5	11	6	11	7	12	8	12	9	12

Apparent force of the wind (Beaufort scale).	Speed of vessel, knots.	Apparent direction of the wind (points off the bow).															
		9		10		11		12		13		14		15		16	
		True direction, points off the bow.	True force, Beaufort scale.	True direction, points off the bow.	True force, Beaufort scale.	True direction, points off the bow.	True force, Beaufort scale.	True direction, points off the bow.	True force, Beaufort scale.	True direction, points off the bow.	True force, Beaufort scale.	True direction, points off the bow.	True force, Beaufort scale.	True direction, points off the bow.	True force, Beaufort scale.	True direction, points off the bow.	True force, Beaufort scale.
0	10	15	2	15	2	15	2	15	2	15	2	15	2	16	2	16	2
	15	15	3	15	3	15	3	15	3	16	3	16	3	16	3	16	3
	20	15	4	15	4	15	4	16	4	16	5	16	5	16	5	16	5
1	10	13	2	14	3	14	3	14	3	15	3	15	3	16	3	16	3
	15	14	3	14	4	14	4	15	4	15	4	15	4	16	4	16	4
	20	14	4	15	5	15	5	15	5	15	5	15	5	16	5	16	5
2	10	12	3	13	3	13	4	14	4	14	4	15	4	15	4	16	4
	15	13	4	13	4	14	5	14	5	15	5	15	5	16	5	16	5
	20	14	5	14	5	14	6	15	6	15	6	15	6	16	6	16	6
3	10	12	4	12	4	13	5	14	5	14	5	15	5	15	5	16	5
	15	12	5	13	5	13	6	14	6	14	6	15	6	15	6	16	6
	20	13	6	13	6	14	6	14	7	15	7	15	7	16	7	16	7
4	10	11	5	12	5	13	5	13	6	14	6	15	6	15	6	16	6
	15	12	6	12	6	13	6	14	7	14	7	15	7	15	7	16	7
	20	12	6	13	7	14	7	14	7	14	8	15	8	16	8	16	8
5	10	11	6	12	6	12	6	13	7	14	7	15	7	15	7	16	7
	15	12	6	12	7	13	7	14	7	14	7	15	8	15	8	16	8
	20	12	7	13	7	13	8	14	8	14	8	15	8	15	8	16	8
6	10	11	7	11	7	12	7	13	7	14	7	14	8	15	8	16	8
	15	11	7	12	7	13	8	13	8	14	8	15	8	15	8	16	8
	20	12	7	12	8	13	8	14	8	14	9	14	9	15	9	16	9
7	10	10	7	11	8	12	8	13	8	14	8	14	8	15	8	16	8
	15	11	8	12	8	12	8	13	9	14	9	15	9	15	9	16	9
	20	11	8	12	9	13	9	13	9	14	9	15	10	15	10	16	10
8	10	10	8	11	9	12	9	13	9	14	9	14	9	15	9	16	9
	15	11	9	11	9	12	9	13	10	14	10	15	10	15	10	16	10
	20	11	9	12	10	13	10	13	10	13	10	15	10	15	11	16	11
9	10	10	9	11	10	12	10	13	10	14	10	14	10	15	10	16	10
	15	10	10	11	10	12	10	13	10	14	11	14	11	15	11	16	11
	20	11	10	12	10	12	10	13	11	14	11	15	11	15	11	16	11
10	10	10	10	11	11	12	11	13	11	13	11	14	11	15	11	16	11
	15	10	11	11	11	12	11	13	11	14	11	14	11	15	11	16	11
	20	11	11	11	11	12	11	13	12	14	12	15	12	16	12	16	12
11	10	10	11	11	11	12	11	12	12	13	12	14	12	15	12	16	12
	15	10	11	11	12	12	12	13	12	14	12	14	12	15	12	16	12
	20	10	12	11	12	12	12	13	12	14	12	14	12	15	12	16	12
12	10	10	12	11	12	12	12	12	12	13	12	14	12	15	12	16	12
	15	10	12	11	12	12	12	13	12	13	12	14	12	15	12	16	12
	20	10	12	11	12	12	12	13	12	14	12	14	12	15	12	16	12

TABLE 33.

Distance by Vertical Angle.

Dist., knots.	Heights in feet.																	
	40	45	50	55	60	65	70	75	80	85	90	95	100	110	120	130	140	150
	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
0.1	3 46	4 14	4 42	5 10	5 38	6 06	6 34	7 02	7 30	7 58	8 25	8 53	9 20	10 15	11 10	12 04	12 58	13 52
.2	1 53	2 07	2 21	2 35	2 49	3 04	3 18	3 32	3 46	4 00	4 14	4 28	4 42	5 10	5 38	6 06	6 34	7 02
.3	1 15	1 25	1 34	1 44	1 53	2 02	2 12	2 21	2 31	2 40	2 49	2 59	3 08	3 27	3 46	4 05	4 23	4 42
.4	0 57	1 04	1 11	1 18	1 25	1 32	1 39	1 46	1 53	2 00	2 07	2 14	2 21	2 35	2 49	3 04	3 18	3 32
0.5	0 45	0 51	0 57	1 02	1 08	1 14	1 19	1 25	1 30	1 36	1 42	1 47	1 53	2 04	2 16	2 27	2 38	2 49
.6	0 38	0 42	0 47	0 52	0 57	1 01	1 06	1 11	1 15	1 20	1 25	1 30	1 34	1 44	1 53	2 02	2 12	2 21
.7	0 32	0 36	0 40	0 44	0 48	0 53	0 57	1 01	1 05	1 09	1 13	1 17	1 21	1 29	1 37	1 45	1 53	2 01
.8	0 28	0 32	0 35	0 39	0 42	0 46	0 49	0 53	0 57	1 00	1 04	1 07	1 11	1 18	1 25	1 32	1 39	1 46
.9	0 25	0 28	0 31	0 35	0 38	0 41	0 44	0 47	0 50	0 53	0 57	1 00	1 03	1 09	1 15	1 22	1 28	1 34
1.0	0 23	0 25	0 28	0 31	0 34	0 37	0 40	0 42	0 45	0 48	0 51	0 54	0 57	1 02	1 08	1 14	1 19	1 25
.1	0 21	0 23	0 26	0 28	0 31	0 33	0 36	0 39	0 41	0 44	0 46	0 49	0 51	0 57	1 02	1 07	1 12	1 17
.2	0 19	0 21	0 24	0 26	0 28	0 31	0 33	0 35	0 38	0 40	0 42	0 45	0 47	0 52	0 57	1 01	1 06	1 11
.3	0 17	0 20	0 22	0 24	0 26	0 28	0 30	0 33	0 35	0 37	0 39	0 41	0 44	0 48	0 52	0 57	1 01	1 05
.4	0 16	0 18	0 20	0 22	0 24	0 26	0 28	0 30	0 32	0 34	0 36	0 38	0 40	0 44	0 48	0 53	0 57	1 01
1.5	0 15	0 17	0 19	0 21	0 23	0 25	0 26	0 28	0 30	0 32	0 34	0 36	0 38	0 41	0 45	0 49	0 53	0 57
.6	0 14	0 16	0 18	0 19	0 21	0 23	0 25	0 27	0 28	0 30	0 32	0 34	0 35	0 39	0 42	0 46	0 49	0 53
.7	0 13	0 15	0 17	0 18	0 20	0 22	0 23	0 25	0 27	0 28	0 30	0 32	0 33	0 37	0 40	0 43	0 47	0 50
.8	0 13	0 14	0 16	0 17	0 19	0 20	0 22	0 24	0 25	0 27	0 28	0 30	0 31	0 35	0 38	0 41	0 44	0 47
.9	0 12	0 13	0 15	0 16	0 18	0 19	0 21	0 22	0 24	0 25	0 27	0 28	0 30	0 33	0 36	0 39	0 42	0 45
2.0	0 11	0 13	0 14	0 16	0 17	0 18	0 20	0 21	0 23	0 24	0 25	0 27	0 28	0 31	0 34	0 37	0 40	0 42
.1	0 11	0 13	0 14	0 15	0 16	0 18	0 19	0 20	0 22	0 23	0 24	0 26	0 27	0 30	0 32	0 35	0 38	0 40
.2	0 10	0 12	0 13	0 14	0 15	0 17	0 18	0 19	0 21	0 22	0 23	0 24	0 26	0 28	0 31	0 33	0 36	0 39
.3	0 10	0 12	0 12	0 14	0 14	0 16	0 17	0 18	0 20	0 21	0 22	0 23	0 25	0 27	0 30	0 32	0 34	0 37
.4	0 10	0 11	0 12	0 13	0 14	0 15	0 17	0 18	0 19	0 20	0 21	0 22	0 24	0 26	0 28	0 31	0 33	0 35
2.5	0 9	0 11	0 11	0 12	0 13	0 15	0 16	0 17	0 18	0 19	0 20	0 21	0 23	0 25	0 27	0 29	0 32	0 34
.6	0 9	0 10	0 11	0 12	0 13	0 14	0 15	0 16	0 17	0 18	0 20	0 21	0 22	0 24	0 26	0 28	0 30	0 33
.7	0 9	0 10	0 10	0 11	0 12	0 14	0 15	0 16	0 17	0 18	0 19	0 20	0 21	0 23	0 25	0 27	0 29	0 31
.8	0 8	0 9	0 10	0 11	0 12	0 13	0 14	0 15	0 16	0 17	0 18	0 19	0 20	0 22	0 24	0 26	0 28	0 30
.9	0 8	0 9	0 10	0 10	0 11	0 13	0 14	0 15	0 16	0 17	0 18	0 19	0 20	0 21	0 23	0 25	0 27	0 29
3.0	0 8	0 9	0 9	0 10	0 10	0 12	0 13	0 14	0 15	0 16	0 17	0 18	0 19	0 21	0 23	0 25	0 26	0 28
.2							0 12	0 13	0 14	0 15	0 16	0 17	0 18	0 19	0 21	0 23	0 25	0 27
.4							0 12	0 12	0 13	0 14	0 15	0 16	0 17	0 18	0 20	0 22	0 23	0 25
.6							0 11	0 12	0 13	0 13	0 14	0 15	0 16	0 17	0 19	0 20	0 22	0 24
.8							0 10	0 11	0 12	0 13	0 13	0 14	0 15	0 16	0 18	0 19	0 21	0 22
4.0							0 10	0 11	0 11	0 12	0 13	0 13	0 14	0 16	0 17	0 18	0 20	0 21
.2										0 11	0 12	0 13	0 14	0 15	0 16	0 17	0 19	0 20
.4										0 11	0 12	0 12	0 13	0 14	0 15	0 17	0 18	0 19
.6										0 10	0 11	0 12	0 13	0 14	0 15	0 16	0 17	0 18
.8										0 10	0 11	0 11	0 12	0 13	0 14	0 15	0 16	0 18
5.0										0 10	0 10	0 11	0 11	0 12	0 14	0 15	0 16	0 17

TABLE 33.

Distance by Vertical Angle.

Dist., knots.	Heights in feet.																	
	160	170	180	190	200	300	400	500	600	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000
	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
0.1	14 45	15 37	16 29	17 21	18 13	26 16												
.2	7 30	7 58	8 25	8 53	9 20	13 52	18 13	22 21	26 16	29 56								
.3	5 01	5 19	5 38	5 57	6 15	9 20	12 22	15 20	18 13	21 00	23 41	26 16	28 44					
.4	3 46	4 00	4 14	4 28	4 42	7 02	9 20	11 37	13 52	16 03	18 13	20 18	22 21	26 16	29 56			
0.5	3 01	3 12	3 23	3 35	3 46	5 38	7 30	9 20	11 10	12 58	14 45	16 30	18 13	21 32	24 44	27 46	30 38	
.6	2 31	2 40	2 49	2 59	3 08	4 42	6 15	7 48	9 20	10 52	12 22	13 52	15 20	18 13	21 00	23 41	26 16	28 44
.7	2 09	2 17	2 25	2 33	2 41	4 02	5 22	6 42	8 01	9 20	10 39	11 56	13 13	15 45	18 13	20 36	22 56	25 10
.8	1 53	2 00	2 07	2 14	2 21	3 32	4 42	5 52	7 02	8 11	9 20	10 29	11 37	13 52	16 03	18 13	20 18	22 21
.9	1 40	1 47	1 53	1 59	2 06	3 08	4 11	5 13	6 15	7 17	8 19	9 20	10 21	12 22	14 21	16 18	18 13	20 05
1.0	1 30	1 36	1 42	1 47	1 53	2 49	3 46	4 42	5 38	6 34	7 30	8 25	9 20	11 10	12 58	14 45	16 29	18 13
.1	1 22	1 27	1 33	1 38	1 43	2 34	3 25	4 17	5 08	5 59	6 49	7 40	8 30	10 10	11 49	13 27	15 04	16 39
.2	1 15	1 20	1 25	1 30	1 34	2 21	3 08	3 55	4 42	5 29	6 15	7 02	7 48	9 20	10 52	12 22	13 52	15 20
.3	1 10	1 14	1 18	1 23	1 27	2 10	2 54	3 37	4 20	5 04	5 47	6 30	7 13	8 38	10 03	11 27	12 50	14 12
.4	1 05	1 09	1 13	1 17	1 21	2 01	2 41	3 22	4 02	4 42	5 22	6 02	6 42	8 01	9 20	10 39	11 56	13 13
1.5	1 00	1 04	1 08	1 12	1 15	1 53	2 31	3 08	3 46	4 23	5 01	5 38	6 15	7 30	8 44	9 57	11 10	12 22
.6	0 57	1 00	1 04	1 07	1 11	1 46	2 21	2 57	3 32	4 07	4 42	5 17	5 52	7 02	8 11	9 20	10 29	11 37
.7	0 53	0 57	1 00	1 03	1 07	1 40	2 13	2 46	3 19	3 52	4 26	4 59	5 32	6 38	7 43	8 48	9 53	10 57
.8	0 50	0 53	0 57	1 00	1 03	1 34	2 06	2 37	3 08	3 40	4 11	4 42	5 13	6 15	7 17	8 19	9 20	10 21
.9	0 48	0 51	0 54	0 57	1 00	1 29	1 59	2 29	2 58	3 28	3 58	4 27	4 57	5 56	6 55	7 54	8 52	9 50
2.0	0 45	0 48	0 51	0 54	0 57	1 25	1 53	2 21	2 49	3 18	3 46	4 14	4 42	5 38	6 34	7 30	8 25	9 20
.1	0 43	0 46	0 48	0 51	0 54	1 21	1 48	2 15	2 41	3 08	3 35	4 02	4 29	5 22	6 15	7 08	8 01	8 53
.2	0 41	0 44	0 46	0 49	0 51	1 17	1 43	2 08	2 34	3 00	3 25	3 51	4 17	5 08	5 59	6 49	7 40	8 30
.3	0 39	0 42	0 44	0 47	0 49	1 14	1 38	2 03	2 27	2 52	3 16	3 41	4 05	4 55	5 44	6 32	7 21	8 09
.4	0 38	0 40	0 42	0 45	0 47	1 11	1 34	1 58	2 21	2 45	3 08	3 32	3 55	4 42	5 29	6 15	7 02	7 48
2.5	0 36	0 38	0 41	0 43	0 45	1 08	1 30	1 53	2 16	2 38	3 01	3 23	3 46	4 31	5 16	6 01	6 45	7 30
.6	0 35	0 37	0 39	0 41	0 44	1 05	1 27	1 49	2 10	2 32	2 54	3 16	3 37	4 20	5 04	5 47	6 30	7 13
.7	0 34	0 36	0 38	0 40	0 42	1 03	1 24	1 45	2 06	2 27	2 47	3 08	3 29	4 11	4 53	5 34	6 15	6 57
.8	0 32	0 34	0 36	0 38	0 40	1 01	1 21	1 41	2 01	2 21	2 41	3 02	3 22	4 02	4 42	5 22	6 02	6 42
.9	0 31	0 33	0 35	0 37	0 39	0 58	1 18	1 37	1 57	2 16	2 36	2 55	3 15	3 54	4 32	5 11	5 50	6 28
3.0	0 30	0 32	0 34	0 36	0 38	0 57	1 15	1 34	1 53	2 12	2 31	2 49	3 08	3 46	4 23	5 01	5 38	6 15
.2	0 28	0 30	0 32	0 34	0 35	0 53	1 11	1 28	1 46	2 04	2 21	2 39	2 57	3 32	4 07	4 42	5 17	5 52
.4	0 27	0 28	0 30	0 32	0 33	0 50	1 07	1 23	1 40	1 56	2 13	2 30	2 46	3 19	3 52	4 26	4 59	5 32
.6	0 25	0 27	0 28	0 30	0 31	0 47	1 03	1 19	1 34	1 50	2 06	2 21	2 37	3 08	3 40	4 11	4 42	5 13
.8	0 24	0 25	0 27	0 28	0 30	0 45	1 00	1 14	1 29	1 44	1 59	2 14	2 29	2 58	3 28	3 58	4 27	4 57
4.0	0 23	0 24	0 25	0 27	0 28	0 42	0 57	1 11	1 25	1 39	1 53	2 07	2 21	2 49	3 18	3 46	4 14	4 42
.2	0 22	0 23	0 24	0 26	0 27	0 40	0 54	1 07	1 21	1 34	1 48	2 01	2 15	2 41	3 08	3 35	4 02	4 29
.4	0 21	0 22	0 23	0 24	0 26	0 39	0 51	1 04	1 17	1 30	1 43	1 56	2 08	2 34	3 00	3 25	3 51	4 17
.6	0 20	0 21	0 22	0 23	0 25	0 37	0 49	1 01	1 14	1 26	1 38	1 51	2 03	2 27	2 52	3 16	3 41	4 05
.8	0 19	0 20	0 21	0 22	0 24	0 35	0 47	0 59	1 11	1 22	1 34	1 46	1 58	2 21	2 45	3 08	3 32	3 55
5.0	0 18	0 19	0 20	0 21	0 23	0 34	0 45	0 57	1 08	1 19	1 30	1 42	1 53	2 16	2 38	3 01	3 23	3 46

TABLE 34.

For finding the distance of an object by an angle, measured from an elevated position, between the object and the horizon beyond.

Dist., yards.	Height of the Eye Above the Level of the Sea, in Feet.											Dist., yards.
	20	30	40	50	60	70	80	90	100	110	120	
	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	
100	3 44	5 37	7 29	9 21	11 11	13 00	14 47	16 34	18 16	19 58	21 37	100
200	1 50	2 46	3 43	4 39	5 35	6 31	7 27	8 23	9 18	10 13	11 08	200
300	1 12	1 49	2 26	3 04	3 41	4 19	4 56	5 33	6 11	6 48	7 25	300
400	52	1 21	1 48	2 16	2 44	3 12	3 40	4 08	4 36	5 04	5 32	400
500	41	1 03	1 25	1 48	2 10	2 32	2 54	3 17	3 39	4 01	4 24	500
600	34	52	1 10	1 29	1 47	2 05	2 24	2 42	3 01	3 20	3 38	600
700	28	44	1 01	1 15	1 31	1 46	2 01	2 18	2 34	2 50	3 05	700
800	24	38	51	1 05	1 18	1 32	1 46	2 00	2 13	2 27	2 41	800
900	21	33	45	57	1 09	1 22	1 33	1 45	1 57	2 10	2 22	900
1,000	18	29	40	50	1 01	1 12	1 23	1 34	1 45	1 56	2 07	1,000
1,100	16	26	35	45	55	1 05	1 15	1 24	1 34	1 44	1 54	1,100
1,200	15	23	32	41	50	59	1 08	1 17	1 26	1 35	1 44	1,200
1,300	13	21	29	37	45	53	1 02	1 10	1 18	1 27	1 35	1,300
1,400	12	19	27	34	41	49	57	1 04	1 12	1 20	1 27	1,400
1,500	11	18	24	31	38	45	52	59	1 07	1 14	1 21	1,500
1,600	10	16	22	29	35	42	48	55	1 02	1 08	1 15	1,600
1,700		15	21	27	33	39	45	51	58	1 04	1 10	1,700
1,800		14	19	25	31	36	42	48	54	1 00	1 06	1,800
1,900		13	18	23	29	34	39	45	50	56	1 02	1,900
2,000		12	17	22	27	32	37	42	47	53	58	2,000
2,100		11	16	20	25	30	35	40	45	50	55	2,100
2,200		10	15	19	24	28	33	38	42	47	52	2,200
2,300			14	18	22	27	31	36	40	45	49	2,300
2,400			13	17	21	25	29	34	38	42	47	2,400
2,500			12	16	20	24	28	32	36	40	44	2,500
2,600			11	15	19	23	26	30	34	38	42	2,600
2,700			11	14	18	22	25	29	33	36	40	2,700
2,800			10	14	17	20	24	28	31	35	38	2,800
2,900				13	16	19	23	26	30	33	37	2,900
3,000				12	15	19	22	25	28	32	35	3,000
3,100				12	15	18	21	24	27	30	34	3,100
3,200				11	14	17	20	23	26	29	32	3,200
3,300				10	13	16	19	22	25	28	31	3,300
3,400					13	15	18	21	24	27	30	3,400
3,500					12	15	17	20	23	26	29	3,500
3,600					12	14	17	19	22	25	27	3,600
3,700					11	13	16	19	21	24	26	3,700
3,800					11	13	15	18	20	23	25	3,800
3,900					10	12	15	17	20	22	25	3,900
4,000						12	14	16	19	21	24	4,000
4,100						11	14	16	18	20	23	4,100
4,200						11	13	15	17	20	22	4,200
4,300						10	13	15	17	19	21	4,300
4,400							12	14	16	18	21	4,400
4,500							12	14	16	18	20	4,500
4,600							11	13	15	17	19	4,600
4,700							11	13	15	17	19	4,700
4,800							10	12	14	16	18	4,800
4,900								12	14	15	17	4,900
5,000								11	13	15	17	5,000

TABLE 35.

Speed in knots per hour developed by a vessel traversing a measured nautical mile in any given number of minutes and seconds.

Sec.	Number of minutes.												Sec.
	1	2	3	4	5	6	7	8	9	10	11	12	
	Knots.	*Knots.*	*Knots.*	*Knots.*	*Knots.*	*Knots.*	*Knots.*	*Knots.*	*Knots.*	*Knots.*	*Knots.*	*Knots.*	
0	60.000	30.000	20.000	15.000	12.000	10.000	8.571	7.500	6.666	6.000	5.455	5.000	0
1	59.016	29.752	19.890	14.938	11.960	9.972	8.551	7.484	6.654	5.990	5.446	4.993	1
2	58.065	29.508	19.780	14.876	11.920	9.944	8.530	7.468	6.642	5.980	5.438	4.986	2
3	57.143	29.268	19.672	14.815	11.880	9.917	8.510	7.453	6.629	5.970	5.429	4.979	3
4	56.250	29.032	19.565	14.754	11.841	9.890	8.490	7.438	6.617	5.960	5.421	4.972	4
5	55.385	28.800	19.460	14.694	11.803	9.863	8.470	7.422	6.605	5.950	5.413	4.965	5
6	54.545	28.571	19.355	14.634	11.764	9.836	8.450	7.407	6.593	5.940	5.405	4.958	6
7	53.731	28.346	19.251	14.575	11.726	9.809	8.430	7.392	6.581	5.930	5.397	4.951	7
8	52.941	28.125	19.149	14.516	11.688	9.783	8.411	7.377	6.569	5.921	5.389	4.945	8
9	52.174	27.907	19.048	14.458	11.650	9.756	8.392	7.362	6.557	5.911	5.381	4.938	9
10	51.429	27.692	18.947	14.400	11.613	9.729	8.372	7.346	6.545	5.902	5.373	4.932	10
11	50.704	27.481	18.848	14.342	11.575	9.703	8.353	7.331	6.533	5.892	5.365	4.924	11
12	50.000	27.273	18.750	14.286	11.538	9.677	8.334	7.317	6.521	5.882	5.357	4.918	12
13	49.315	27.068	18.652	14.229	11.501	9.651	8.315	7.302	6.509	5.872	5.349	4.911	13
14	48.649	26.866	18.556	14.173	11.465	9.625	8.295	7.287	6.498	5.863	5.341	4.904	14
15	48.000	26.667	18.461	14.118	11.428	9.600	8.276	7.272	6.486	5.853	5.333	4.897	15
16	47.368	26.471	18.367	14.063	11.392	9.574	8.257	7.258	6.474	5.844	5.325	4.891	16
17	46.753	26.277	18.274	14.008	11.356	9.549	8.238	7.243	6.463	5.834	5.317	4.884	17
18	46.154	26.087	18.182	13.953	11.321	9.524	8.219	7.229	6.451	5.825	5.309	4.878	18
19	45.570	25.899	18.090	13.900	11.285	9.499	8.200	7.214	6.440	5.815	5.301	4.871	19
20	45.000	25.714	18.000	13.846	11.250	9.473	8.181	7.200	6.428	5.806	5.294	4.865	20
21	44.444	25.532	17.910	13.793	11.214	9.448	8.163	7.185	6.417	5.797	5.286	4.858	21
22	43.902	25.352	17.822	13.740	11.180	9.424	8.144	7.171	6.405	5.787	5.278	4.851	22
23	43.373	25.175	17.734	13.688	11.146	9.399	8.126	7.157	6.394	5.778	5.270	4.845	23
24	42.857	25.000	17.647	13.636	11.111	9.375	8.108	7.142	6.383	5.769	5.263	4.838	24
25	42.353	24.828	17.560	13.584	11.077	9.350	8.090	7.128	6.371	5.760	5.255	4.832	25
26	41.860	24.658	17.475	13.533	11.043	9.326	8.071	7.114	6.360	5.750	5.247	4.825	26
27	41.379	24.490	17.391	13.483	11.009	9.302	8.053	7.100	6.349	5.741	5.240	4.819	27
28	40.909	24.324	17.307	13.433	10.975	9.278	8.035	7.086	6.338	5.732	5.232	4.812	28
29	40.449	24.161	17.225	13.383	10.942	9.254	8.017	7.072	6.327	5.723	5.224	4.806	29
30	40.000	24.000	17.143	13.333	10.909	9.230	8.000	7.059	6.315	5.714	5.217	4.800	30
31	39.560	23.841	17.061	13.284	10.876	9.207	7.982	7.045	6.304	5.705	5.210	4.793	31
32	39.130	23.684	16.981	13.235	10.843	9.183	7.964	7.031	6.293	5.696	5.202	4.787	32
33	38.710	23.529	16.901	13.186	10.810	9.160	7.947	7.017	6.282	5.687	5.195	4.780	33
34	38.298	23.377	16.822	13.138	10.778	9.137	7.929	7.004	6.271	5.678	5.187	4.774	34
35	37.895	23.226	16.744	13.091	10.746	9.113	7.912	6.990	6.260	5.669	5.179	4.768	35
36	37.500	28.077	16.667	13.043	10.714	9.090	7.895	6.977	6.250	5.660	5.172	4.761	36
37	37.113	22.930	16.590	12.996	10.682	9.068	7.877	6.963	6.239	5.651	5.164	4.755	37
38	36.735	22.785	16.514	12.950	10.651	9.045	7.860	6.950	6.228	5.642	5.157	4.749	38
39	36.364	22.642	16.438	12.903	10.619	9.022	7.843	6.936	6.217	5.633	5.150	4.743	39
40	36.000	22.500	16.363	12.857	10.588	9.000	7.826	6.923	6.207	5.625	5.143	4.737	40
41	35.644	22.360	16.289	12.811	10.557	8.977	7.809	6.909	6.196	5.616	5.135	4.731	41
42	35.294	22.222	16.216	12.766	10.526	8.955	7.792	6.896	6.185	5.607	5.128	4.724	42
43	34.951	22.086	16.143	12.721	10.495	8.933	7.775	6.883	6.174	5.598	5.121	4.718	43
44	34.615	21.951	16.071	12.676	10.465	8.911	7.758	6.870	6.164	5.590	5.114	4.712	44
45	34.286	21.818	16.000	12.631	10.434	8.889	7.741	6.857	6.153	5.581	5.106	4.706	45
46	33.962	21.687	15.929	12.587	10.404	8.867	7.725	6.844	6.143	5.572	5.099	4.700	46
47	33.645	21.557	15.859	12.543	10.375	8.845	7.708	6.831	6.132	5.564	5.091	4.693	47
48	33.333	21.429	15.789	12.500	10.345	8.823	7.692	6.818	6.122	5.555	5.084	4.687	48
49	33.028	21.302	15.721	12.456	10.315	8.801	7.675	6.805	6.112	5.547	5.077	4.681	49
50	32.727	21.176	15.652	12.413	10.286	8.780	7.659	6.792	6.101	5.538	5.070	4.675	50
51	32.432	21.053	15.584	12.371	10.256	8.759	7.643	6.779	6.091	5.530	5.063	4.669	51
52	32.143	20.930	15.517	12.329	10.227	8.737	7.627	6.766	6.081	5.521	5.056	4.663	52
53	31.858	20.809	15.450	12.287	10.198	8.716	7.611	6.754	6.071	5.513	5.049	4.657	53
54	31.579	20.690	15.384	12.245	10.169	8.695	7.595	6.741	6.060	5.504	5.042	4.651	54
55	31.304	20.571	15.319	12.203	10.140	8.675	7.579	6.739	6.050	5.496	5.035	4.645	55
56	31.034	20.455	15.254	12.162	10.112	8.654	7.563	6.716	6.040	5.487	5.028	4.639	56
57	30.769	20.339	15.190	12.121	10.084	8.633	7.547	6.704	6.030	5.479	5.020	4.633	57
58	30.508	20.225	15.126	12.080	10.055	8.612	7.531	6.691	6.020	5.471	5.013	4.627	58
59	30.252	20.112	15.062	12.040	10.027	8.591	7.515	6.679	6.010	5.463	5.006	4.621	59
Sec.	1	2	3	4	5	6	7	8	9	10	11	12	Sec.

TABLE 36.

Reduction of Local Mean Time to Standard Meridian Time, and the reverse.

[If local meridian is east of standard meridian, subtract from local mean time, or add to standard meridian time. If local meridian is west of standard meridian, add to local mean time, or subtract from standard meridian time.]

Difference of longitude between local meridian and standard meridian.	Reduction to be applied to local mean time.	Difference of longitude between local meridian and standard meridian.	Reduction to be applied to local mean time.
° ′ ° ′	*Minutes.*	° ′ ° ′	*Minutes.*
0 00 to 0 07	0	7 23 to 7 37	30
0 08 to 0 22	1	7 38 to 7 52	31
0 23 to 0 37	2	7 53 to 8 07	32
0 38 to 0 52	3	8 08 to 8 22	33
0 53 to 1 07	4	8 23 to 8 37	34
1 08 to 1 22	5	8 38 to 8 52	35
1 23 to 1 37	6	8 53 to 9 07	36
1 38 to 1 52	7	9 08 to 9 22	37
1 53 to 2 07	8	9 23 to 9 37	38
2 08 to 2 22	9	9 38 to 9 52	39
2 23 to 2 37	10	9 53 to 10 07	40
2 38 to 2 52	11	10 08 to 10 22	41
2 53 to 3 07	12	10 23 to 10 37	42
3 08 to 3 22	13	10 38 to 10 52	43
3 23 to 3 37	14	10 53 to 11 07	44
3 38 to 3 52	15	11 08 to 11 22	45
3 53 to 4 07	16	11 23 to 11 37	46
4 08 to 4 22	17	11 38 to 11 52	47
4 23 to 4 37	18	11 53 to 12 07	48
4 38 to 4 52	19	12 08 to 12 22	49
4 53 to 5 07	20	12 23 to 12 37	50
5 08 to 5 22	21	12 38 to 12 52	51
5 23 to 5 37	22	12 53 to 13 07	52
5 38 to 5 52	23	13 08 to 13 22	53
5 53 to 6 07	24	13 23 to 13 37	54
6 08 to 6 22	25	13 38 to 13 52	55
6 23 to 6 37	26	13 53 to 14 07	56
6 38 to 6 52	27	14 08 to 14 22	57
6 53 to 7 07	28	14 23 to 14 37	58
7 08 to 7 22	29	14 38 to 14 52	59

TABLE 37.

Log. A and Log. B.

[For Computing the Equation of Equal Altitudes. For Noon, A−; for Midnight, A+; for Noon or Midnight, B+.
Argument=Elapsed Time.]

Elapsed time.	0^{h}		1^{h}		2^{h}		3^{h}		4^{h}		5^{h}	
m.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.
0	9.4059	9.4059	9.4072	9.4034	9.4109	9.3959	9.4172	9.3828	9.4260	9.3635	9.4374	9.3369
1	.4059	.4059	.4072	.4034	.4110	.3957	.4173	.3825	.4261	.3631	.4376	.3364
2	.4059	.4059	.4073	.4033	.4111	.3955	.4174	.3822	.4263	.3627	.4378	.3358
3	.4059	.4059	.4073	.4032	.4112	.3953	.4175	.3820	.4265	.3624	.4380	.3353
4	.4059	.4059	.4074	.4031	.4113	.3952	.4177	.3817	.4266	.3620	.4383	.3348
5	9.4059	9.4059	9.4074	9.4030	9.4113	9.3950	9.4178	9.3814	9.4268	9.3616	9.4385	9.3343
6	.4060	.4059	.4074	.4029	.4114	.3948	.4179	.3811	.4270	.3612	.4387	.3337
7	.4060	.4059	.4075	.4028	.4115	.3946	.4181	.3809	.4272	.3608	.4389	.3332
8	.4060	.4059	.4075	.4027	.4116	.3944	.4182	.3806	.4273	.3604	.4391	.3327
9	.4060	.4059	.4076	.4026	.4117	.3943	.4183	.3803	.4275	.3600	.4393	.3221
10	9.4060	9.4059	9.4076	9.4025	9.4118	9.3941	9.4184	9.3800	9.4277	9.3596	9.4396	9.3316
11	.4060	.4059	.4077	.4024	.4119	.3939	.4186	.3797	.4279	.3592	.4398	.3311
12	.4060	.4058	.4077	.4023	.4120	.3937	.4187	.3794	.4280	.3588	.4400	.3305
13	.4060	.4058	.4078	.4022	.4121	.3935	.4188	.3792	.4282	.3584	.4402	.3300
14	.4060	.4058	.4078	.4021	.4121	.3933	.4190	.3789	.4284	.3580	.4405	.3294
15	9.4060	9.4058	9.4079	9.4020	9.4122	9.3931	9.4191	9.3786	9.4286	9.3576	9.4407	9.3289
16	.4060	.4058	.4079	.4019	.4123	.3929	.4193	.3783	.4288	.3572	.4409	.3283
17	.4060	.4057	.4080	.4018	.4124	.3927	.4194	.3780	.4289	.3568	.4411	.3278
18	.4061	.4057	.4080	.4017	.4125	.3925	.4195	.3777	.4291	.3564	.4414	.3272
19	.4061	.4057	.4081	.4016	.4126	.3923	.4197	.3774	.4293	.3559	.4416	.3266
20	9.4061	9.4057	9.4081	9.4015	9.4127	9.3921	9.4198	9.3771	9.4295	9.3555	9.4418	9.3261
21	.4061	.4056	.4082	.4014	.4128	.3919	.4199	.3768	.4297	.3551	.4420	.3255
22	.4061	.4056	.4083	.4013	.4129	.3917	.4201	.3765	.4299	.3547	.4423	.3249
23	.4061	.4056	.4083	.4012	.4130	.3915	.4202	.3762	.4300	.3542	.4425	.3244
24	.4061	.4055	.4084	.4010	.4131	.3913	.4204	.3759	.4302	.3538	.4427	.3238
25	9.4062	9.4055	9.4084	9.4009	9.4132	9.3911	9.4205	9.3756	9.4304	9.3534	9.4430	9.3232
26	.4062	.4055	.4085	.4008	.4133	.3909	.4207	.3752	.4306	.3530	.4432	.3226
27	.4062	.4054	.4086	.4007	.4134	.3907	.4208	.3749	.4308	.3525	.4434	.3220
28	.4062	.4054	.4086	.4006	.4135	.3905	.4209	.3746	.4310	.3521	.4437	.3214
29	.4062	.4054	.4087	.4004	.4136	.3903	.4211	.3743	.4312	.3516	.4439	.3208
30	9.4062	9.4053	9.4087	9.4003	9.4137	9.3900	9.4212	9.3740	9.4314	9.3512	9.4441	9.3203
31	.4063	.4053	.4088	.4002	.4138	.3898	.4214	.3737	.4315	.3508	.4444	.3197
32	.4063	.4052	.4089	.4001	.4139	.3896	.4215	.3733	.4317	.3503	.4446	.3191
33	.4063	.4052	.4089	.3999	.4140	.3894	.4217	.3730	.4319	.3499	.4448	.3185
34	.4063	.4051	.4090	.3998	.4141	.3892	.4218	.3727	.4321	.3494	.4451	.3178
35	9.4064	9.4051	9.4091	9.3997	9.4142	9.3889	9.4220	9.3723	9.4323	9.3490	9.4453	9.3172
36	.4064	.4050	.4091	.3995	.4144	.3887	.4221	.3720	.4325	.3485	.4456	.3166
37	.4064	.4050	.4092	.3994	.4145	.3885	.4223	.3717	.4327	.3480	.4458	.3160
38	.4064	.4049	.4093	.3993	.4146	.3882	.4224	.3713	.4329	.3476	.4460	.3154
39	.4065	.4049	.4093	.3991	.4147	.3880	.4226	.3710	.4331	.3471	.4463	.3148
40	9.4065	9.4048	9.4094	9.3990	9.4148	9.3878	9.4227	9.3707	9.4333	9.3467	9.4465	9.3142
41	.4065	.4048	.4095	.3988	.4149	.3875	.4229	.3703	.4335	.3462	.4468	.3135
42	.4065	.4047	.4095	.3987	.4150	.3873	.4231	.3700	.4337	.3457	.4470	.3129
43	.4066	.4047	.4096	.3985	.4151	.3871	.4232	.3696	.4339	.3453	.4473	.3123
44	.4066	.4046	.4097	.3984	.4152	.3868	.4234	.3693	.4341	.3448	.4475	.3116
45	9.4066	9.4045	9.4097	9.3982	9.4154	9.3866	9.4235	9.3690	9.4343	9.3443	9.4477	9.3110
46	.4067	.4045	.4098	.3981	.4155	.3863	.4237	.3686	.4345	.3438	.4480	.3103
47	.4067	.4044	.4099	.3979	.4156	.3861	.4238	.3683	.4347	.3433	.4482	.3097
48	.4067	.4043	.4100	.3978	.4157	.3859	.4240	.3679	.4349	.3429	.4485	.3091
49	.4068	.4043	.4100	.3976	.4158	.3856	.4242	.3675	.4351	.3424	.4487	.3084
50	9.4068	9.4042	9.4101	9.3975	9.4159	9.3854	9.4243	9.3672	9.4353	9.3419	9.4490	9.3078
51	.4068	.4041	.4102	.3973	.4161	.3851	.4245	.3668	.4355	.3414	.4492	.3071
52	.4069	.4041	.4103	.3972	.4162	.3849	.4246	.3665	.4357	.3409	.4494	.3064
53	.4069	.4040	.4103	.3970	.4163	.3846	.4248	.3661	.4359	.3404	.4497	.3058
54	.4069	.4039	.4104	.3969	.4164	.3843	.4250	.3657	.4361	.3399	.4500	.3051
55	9.4070	9.4038	9.4105	9.3967	9.4165	9.3841	9.4251	9.3654	9.4363	9.3394	9.4503	9.3044
56	.4070	.4038	.4106	.3965	.4167	.3838	.4253	.3650	.4366	.3389	.4505	.3038
57	.4071	.4037	.4107	.3964	.4168	.3836	.4255	.3646	.4368	.3384	.4508	.3031
58	.4071	.4036	.4107	.3962	.4169	.3833	.4256	.3643	.4370	.3379	.4510	.3024
59	.4071	.4035	.4108	.3960	.4170	.3830	.4258	.3639	.4372	.3374	.4513	.3017
60	9.4072	9.4034	9.4109	9.3959	9.4172	9.3828	9.4260	9.3635	9.4374	9.3369	9.4515	9.3010

TABLE 37.

Log. A and Log. B.

[For Computing the Equation of Equal Altitudes. For Noon, A−; for Midnight, A+; for Noon or Midnight, B+. Argument=Elapsed Time.]

Elapsed time.	6^h		7^h		8^h		9^h		10^h		11^h	
m.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.
0	9.4515	9.3010	9.4685	9.2530	9.4884	9.1874	9.5115	9.0943	9.5379	8.9509	9.5680	8.6837
1	.4518	.3003	.4688	.2520	.4888	.1861	.5119	.0925	.5384	.9478	.5685	.6770
2	.4521	.2996	.4691	.2511	.4892	.1848	.5123	.0906	.5389	.9447	.5691	.6701
3	.4523	.2989	.4694	.2502	.4895	.1835	.5127	.0887	.5393	.9416	.5696	.6632
4	.4526	.2982	.4697	.2492	.4899	.1822	.5132	.0867	.5398	.9384	.5701	.6560
5	9.4528	9.2975	9.4701	9.2483	9.4902	9.1809	9.5136	9.0848	9.5403	8.9352	9.5707	8.6488
6	.4531	.2968	.4704	.2473	.4906	.1796	.5140	.0828	.5408	.9320	.5712	.6414
7	.4534	.2961	.4707	.2463	.4910	.1782	.5144	.0809	.5412	.9287	.5718	.6339
8	.4536	.2954	.4710	.2454	.4913	.1769	.5148	.0789	.5417	.9254	.5723	.6262
9	.4539	.2947	.4713	.2444	.4917	.1756	.5153	.0769	.5422	.9221	.5728	.6183
10	9.4542	9.2940	9.4716	9.2434	9.4921	9.1742	9.5157	9.0749	9.5427	8.9187	9.5734	8.6103
11	.4544	.2932	.4719	.2425	.4924	.1728	.5161	.0729	.5432	.9153	.5739	.6021
12	.4547	.2925	.4723	.2415	.4928	.1715	.5165	.0708	.5436	.9118	.5745	.5937
13	.4550	.2918	.4726	.2405	.4932	.1701	.5169	.0688	.5441	.9083	.5750	.5852
14	.4552	.2911	.4729	.2395	.4935	.1687	.5174	.0667	.5446	.9048	.5756	.5764
15	9.4555	9.2903	9.4732	9.2385	9.4939	9.1673	9.5178	9.0646	9.5451	8.9013	9.5761	8.5674
16	.4558	.2896	.4735	.2375	.4943	.1659	.5182	.0625	.5456	.8977	.5767	.5583
17	.4561	.2888	.4738	.2365	.4946	.1645	.5186	.0604	.5461	.8940	.5772	.5488
18	.4563	.2881	.4742	.2355	.4950	.1630	.5191	.0583	.5466	.8903	.5778	.5392
19	.4566	.2873	.4745	.2344	.4954	.1616	.5195	.0561	.5470	.8866	.5783	.5293
20	9.4569	9.2866	9.4748	9.2334	9.4958	9.1602	9.5199	9.0540	9.5475	8.8829	9.5789	8.5192
21	.4572	.2858	.4751	.2324	.4961	.1587	.5204	.0518	.5480	.8791	.5794	.5088
22	.4574	.2850	.4755	.2313	.4965	.1573	.5208	.0496	.5485	.8752	.5800	.4981
23	.4577	.2843	.4758	.2303	.4969	.1558	.5212	.0474	.5490	.8713	.5806	.4871
24	.4580	.2835	.4761	.2292	.4973	.1543	.5217	.0452	.5495	.8674	.5811	.4758
25	9.4583	9.2827	9.4764	9.2282	9.4977	9.1528	9.5221	9.0429	9.5500	8.8634	9.5817	8.4641
26	.4585	.2819	.4768	.2271	.4980	.1513	.5225	.0406	.5505	.8594	.5822	.4521
27	.4588	.2812	.4771	.2261	.4984	.1498	.5230	.0383	.5510	.8553	.5828	.4397
28	.4591	.2804	.4774	.2250	.4988	.1483	.5234	.0360	.5515	.8512	.5834	.4270
29	.4594	.2796	.4778	.2239	.4992	.1468	.5238	.0337	.5520	.8470	.5839	.4138
30	9.4597	9.2788	9.4781	9.2228	9.4996	9.1453	9.5243	9.0314	9.5525	8.8427	9.5845	8.4001
31	.4600	.2780	.4784	.2217	.5000	.1437	.5247	.0290	.5530	.8384	.5851	.3860
32	.4602	.2772	.4788	.2206	.5003	.1422	.5252	.0266	.5535	.8341	.5856	.3713
33	.4605	.2764	.4791	.2195	.5007	.1406	.5256	.0242	.5540	.8297	.5862	.3561
34	.4608	.2756	.4794	.2184	.5011	.1390	5261	.0218	.5545	.8253	.5868	.3403
35	9.4611	9.2747	9.4798	9.2173	9.5015	9.1375	9.5265	9.0194	9.5550	8.8208	9.5874	8.3239
36	.4614	.2739	.4801	.2162	.5019	.1359	.5269	.0169	.5555	.8162	.5879	.3067
37	.4617	.2731	.4804	.2151	.5023	.1343	.5274	.0144	.5560	.8115	.5885	.2888
38	.4620	.2723	.4808	.2140	.5027	.1327	.5278	.0119	.5565	.8068	.5891	.2701
39	.4622	.2714	.4811	.2128	.5031	.1310	.5283	.0094	.5570	.8020	.5897	.2505
40	9.4625	9.2706	9.4815	9.2117	9.5035	9.1294	9.5287	9.0069	9.5576	8.7972	9.5902	8.2299
41	.4628	.2698	.4818	.2105	.5038	.1278	.5292	.0043	.5581	.7923	.5908	.2082
42	.4631	.2689	.4821	.2094	.5042	.1261	.5296	.0017	.5586	.7873	.5914	.1853
43	.4634	.2681	.4825	.2082	.5046	.1244	.5301	8.9991	.5591	.7823	.5920	.1611
44	.4637	.2672	.4828	.2070	.5050	.1228	.5305	.9965	.5596	.7772	.5926	.1354
45	9.4640	9.2664	9.4832	9.2059	9.5054	9.1211	9.5310	8.9938	9.5601	8.7720	9.5931	8.1080
46	.4643	.2655	.4835	.2047	.5058	.1194	.5315	.9911	.5606	.7668	.5937	.0786
47	.4646	.2646	.4839	.2035	.5062	.1177	.5319	.9884	.5612	.7614	.5943	.0470
48	.4649	.2638	.4842	.2023	.5066	.1159	.5324	.9857	.5617	.7560	.5949	.0128
49	.4652	.2629	.4846	.2011	.5070	.1142	.5328	.9830	.5622	.7505	.5955	7.9756
50	9.4655	9.2620	9.4849	9.1999	9.5074	9.1125	9.5333	8.9802	9.5627	8.7449	9.5961	7.9348
51	.4658	.2611	.4853	.1987	.5078	.1107	.5337	.9774	.5632	.7392	.5967	.8897
52	.4661	.2602	.4856	.1974	.5082	.1089	.5342	.9745	.5638	.7335	.5973	.8391
53	.4664	.2593	.4860	.1962	.5086	.1072	.5347	.9717	.5643	.7276	.5979	.7817
54	.4667	.2584	.4863	.1950	.5091	.1054	.5351	.9688	.5648	.7217	.5985	.7154
55	9.4670	9.2575	9.4867	9.1937	9.5095	9.1036	9.5356	8.9659	9.5654	8.7156	9.5991	7.6368
56	.4673	.2566	.4870	.1925	.5099	.1017	.5361	.9630	.5659	.7094	.5997	.5405
57	.4676	.2557	.4874	.1912	.5103	.0999	.5365	.9600	.5664	.7032	.6003	.4162
58	.4679	.2548	.4877	.1900	.5107	.0981	.5370	.9570	.5669	.6968	.6009	.2407
59	.4682	.2539	.4881	.1887	.5111	.0962	.5375	.9540	.5675	.6903	.6015	6.9591
60	9.4685	9.2530	9.4884	9.1874	9.5115	9.0943	9.5379	8.9509	9.5680	8.6837	9.6021	*Inf.*

TABLE 37.

Log. A and Log. B.

[For Computing the Equation of Equal Altitudes. For Noon, A −; for Midnight, A +; for Noon or Midnight, B −. Argument = Elapsed Time.]

Elapsed time.	12^{h}		13^{h}		14^{h}		15^{h}		16^{h}		17^{h}	
	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.
m.												
0	9.6021	*Inf.*	9.6406	8.7563	9.6841	9.0971	9.7333	9.3162	9.7895	9.4884	9.8539	9.6383
1	.6027	6.9603	.6412	.7641	.6848	.1014	.7342	.3194	.7905	.4911	.8550	.6407
2	.6033	7.2431	.6419	.7718	.6856	.1057	.7351	.3225	.7915	.4937	.8562	.6431
3	.6039	.4198	.6426	.7794	.6864	.1099	.7360	.3256	.7925	.4963	.8573	.6455
4	.6045	.5453	.6433	.7868	.6872	.1141	.7369	.3287	.7935	.4990	.8585	.6478
5	9.6051	7.6428	9.6440	8.7942	9.6879	9.1183	9.7378	9.3319	9.7945	9.5016	9.8597	9.6502
6	.6057	.7226	.6447	.8015	.6887	.1224	.7386	.3350	.7955	.5042	.8608	.6526
7	.6063	.7902	.6454	.8087	.6895	.1265	.7395	.3380	.7965	.5068	.8620	.6550
8	.6069	.8488	.6461	.8158	.6903	.1306	.7404	.3411	.7975	.5094	.8632	.6573
9	.6075	.9005	.6467	.8227	.6911	.1347	.7413	.3442	.7986	.5120	.8644	.6597
10	9.6082	7.9469	9.6474	8.8296	9.6919	9.1387	9.7422	9.3472	9.7996	9.5146	9.8655	9.6621
11	.6088	.9889	.6481	.8364	.6926	.1428	.7431	.3503	.8006	.5171	.8667	.6644
12	.6094	8.0273	.6488	.8432	.6934	.1468	.7440	.3533	.8016	.5197	.8679	.6668
13	.6100	.0627	.6495	.8498	.6942	.1507	.7449	.3563	.8027	.5223	.8691	.6691
14	.6106	.0955	.6502	.8564	.6950	.1547	.7458	.3593	.8037	.5248	.8703	.6715
15	9.6112	8.1260	9.6509	8.8628	9.6958	9.1586	9.7467	9.3623	9.8047	9.5274	9.8715	9.6738
16	.6119	.1547	.6516	.8692	.6966	.1625	.7476	.3653	.8058	.5300	.8727	.6762
17	.6125	.1816	.6523	.8756	.6974	.1664	.7485	.3683	.8068	.5325	.8739	.6785
18	.6131	.2071	.6530	.8818	.6982	.1703	.7494	.3713	.8078	.5351	.8751	.6809
19	.6137	.2312	.6538	.8880	.6990	.1741	.7503	.3742	.8089	.5376	.8763	.6832
20	9.6144	8.2541	9.6545	8.8941	9.6998	9.1779	9.7512	9.3772	9.8099	9.5401	9.8775	9.6856
21	.6150	.2759	.6552	.9002	.7006	.1817	.7522	.3801	.8110	.5427	.8787	.6879
22	.6156	.2967	.6559	.9062	.7014	.1855	.7531	.3831	.8120	.5452	.8799	.6903
23	.6163	.3166	.6566	.9121	.7022	.1893	.7540	.3860	.8131	.5477	.8812	.6926
24	.6169	.3357	.6573	.9180	.7030	.1930	.7549	.3889	.8141	.5502	.8824	.6949
25	9.6175	8.3540	9.6580	8.9238	9.7038	9.1967	9.7558	9.3918	9.8152	9.5528	9.8836	9.6973
26	.6182	.3717	.6588	.9295	.7047	.2004	.7568	.3947	.8162	.5553	.8848	.6996
27	.6188	.3887	.6595	.9352	.7055	.2041	.7577	.3976	.8173	.5578	.8861	.7019
28	.6194	.4051	.6602	.9408	.7063	.2078	.7586	.4005	.8184	.5603	.8873	.7043
29	.6201	.4210	.6609	.9464	.7071	.2114	.7595	.4033	.8194	.5628	.8885	.7066
30	9.6207	8.4363	9.6616	8.9519	9.7079	9.2150	9.7605	9.4062	9.8205	9.5653	9.8898	9.7089
31	.6214	.4512	.6624	.9573	.7088	.2186	.7614	.4090	.8216	.5677	.8910	.7112
32	.6220	.4657	.6631	.9627	.7096	.2222	.7624	.4119	.8227	.5702	.8923	.7136
33	.6226	.4796	.6638	.9681	.7104	.2258	.7633	.4147	.8237	.5727	.8935	.7159
34	.6233	.4932	.6645	.9734	.7112	.2293	.7642	.4175	.8248	.5752	.8948	.7182
35	9.6239	8.5064	9.6653	8.9787	9.7121	9.2329	9.7652	9.4204	9.8259	9.5777	9.8961	9.7205
36	.6246	.5192	.6660	.9839	.7129	.2364	.7661	.4232	.8270	.5801	.8973	.7228
37	.6252	.5318	.6667	.9891	.7137	.2399	.7671	.4260	.8281	.5826	.8986	.7251
38	.6259	.5440	.6675	.9942	.7146	.2434	.7680	.4288	.8292	.5850	.8999	.7275
39	.6265	.5559	.6682	.9993	.7154	.2468	.7690	.4316	.8303	.5875	.9011	.7298
40	9.6272	8.5675	9.6690	9.0043	9.7162	9.2503	9.7699	9.4343	9.8314	9.5900	9.9024	9.7321
41	.6279	.5788	.6697	.0093	.7171	.2537	.7709	.4371	.8325	.5924	.9037	.7344
42	.6285	.5899	.6704	.0142	.7179	.2571	.7718	.4399	.8336	.5948	.9050	.7367
43	.6292	.6008	.6712	.0191	.7187	.2605	.7728	.4426	.8347	.5973	.9063	.7390
44	.6298	.6114	.6719	.0240	.7196	.2639	.7738	.4454	.8358	.5997	.9075	.7413
45	9.6305	8.6218	9.6727	9.0288	9.7204	9.2673	9.7747	9.4481	9.8369	9.6022	9.9088	9.7436
46	.6311	.6320	.6734	.0336	.7213	.2706	.7757	.4509	.8380	.6046	.9101	.7459
47	.6318	.6419	.6742	.0384	.7221	.2740	.7767	.4536	.8391	.6070	.9114	.7482
48	.6325	.6517	.6749	.0431	.7230	.2773	.7776	.4563	.8402	.6094	.9127	.7505
49	.6331	.6613	.6757	.0478	.7238	.2806	.7786	.4590	.8414	.6119	.9140	.7529
50	9.6338	8.6707	9.6764	9.0524	9.7247	9.2839	9.7796	9.4617	9.8425	9.6143	9.9154	9.7552
51	.6345	.6799	.6772	.0570	.7256	.2872	.7806	.4644	.8436	.6167	.9167	.7575
52	.6351	.6890	.6779	.0616	.7264	.2905	.7815	.4671	.8447	.6191	.9180	.7598
53	.6358	.6979	.6787	.0662	.7273	.2937	.7825	.4698	.8459	.6215	.9193	.7621
54	.6365	.7067	.6795	.0707	.7281	.2970	.7835	.4725	.8470	.6239	.9206	.7644
55	9.6372	8.7153	9.6802	9.0752	9.7290	9.3002	9.7845	9.4752	9.8481	9.6263	9.9220	9.7667
56	.6378	.7237	.6810	.0796	.7299	.3034	.7855	.4778	.8493	.6287	.9233	.7690
57	.6385	.7321	.6818	.0840	.7307	.3066	.7865	.4805	.8504	.6311	.9246	.7713
58	.6392	.7402	.6825	.0884	.7316	.3098	.7875	.4831	.8516	.6335	.9260	.7736
59	.6399	.7483	.6833	.0928	.7324	.3130	.7885	.4858	.8527	.6359	.9273	.7759
60	9.6406	8.7563	9.6841	9.0971	9.7333	9.3162	9.7895	9.4884	9.8539	9.6383	9.9287	9.7782

TABLE 37.

Log. A and Log. B.

[For Computing the Equation of Equal Altitudes. For Noon, A −; for Midnight, A +; for Noon or Midnight, B −. Argument = Elapsed Time.]

Elapsed time.	18h		19h		20h		21h		22h		23h	
	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.
m.												
0	9. 9287	9. 7782	0. 0172	9. 9167	0. 1249	0. 0625	0. 2623	0. 2279	0. 4523	0. 4372	0. 7689	0. 7652
1	. 9300	. 7804	. 0188	. 9190	. 1269	. 0650	. 2649	. 2309	. 4562	. 4414	. 7765	. 7729
2	. 9314	. 7827	. 0204	. 9213	. 1290	. 0676	. 2676	. 2339	. 4601	. 4455	. 7842	. 7807
3	. 9327	. 7850	. 0221	. 9237	. 1310	. 0701	. 2702	. 2370	. 4640	. 4497	. 7920	. 7886
4	. 9341	. 7873	. 0237	. 9260	. 1330	. 0727	. 2729	. 2401	. 4680	. 4540	. 8000	. 7967
5	9. 9355	9. 7896	0. 0253	9. 9284	0. 1351	0. 0753	0. 2756	0. 2431	0. 4720	0. 4582	0. 8081	0. 8049
6	. 9368	. 7919	. 0270	. 9307	. 1371	. 0779	. 2783	. 2462	. 4761	. 4625	. 8163	. 8133
7	. 9382	. 7942	. 0286	. 9331	. 1392	. 0805	. 2810	. 2493	. 4801	. 4668	. 8247	. 8218
8	. 9396	. 7965	. 0303	. 9355	. 1412	. 0830	. 2838	. 2524	. 4842	. 4711	. 8333	. 8305
9	. 9410	. 7988	. 0319	. 9378	. 1433	. 0856	. 2865	. 2556	. 4884	. 4755	. 8420	. 8393
10	9. 9424	9. 8011	0. 0336	9. 9402	0. 1454	0. 0882	0. 2893	0. 2587	0. 4926	0. 4799	0. 8508	0. 8483
11	. 9437	. 8034	. 0353	. 9426	. 1475	. 0909	. 2921	. 2619	. 4968	. 4844	. 8599	. 8574
12	. 9451	. 8057	. 0370	. 9449	. 1496	. 0935	. 2949	. 2650	. 5010	. 4889	. 8691	. 8667
13	. 9465	. 8080	. 0386	. 9473	. 1517	. 0961	. 2977	. 2682	. 5053	. 4934	. 8786	. 8763
14	. 9479	. 8103	. 0403	. 9497	. 1538	. 0987	. 3005	. 2714	. 5097	. 4980	. 8882	. 8860
15	9. 9493	9. 8126	0. 0420	9. 9520	0. 1559	0. 1013	0. 3034	0. 2746	0. 5140	0. 5026	0. 8980	0. 8959
16	. 9508	. 8149	. 0437	. 9544	. 1581	. 1040	. 3063	. 2778	. 5184	. 5072	. 9080	. 9060
17	. 9522	. 8172	. 0454	. 9568	. 1602	. 1066	. 3091	. 2811	. 5229	. 5118	. 9183	. 9164
18	. 9536	. 8195	. 0472	. 9592	. 1623	. 1093	. 3120	. 2843	. 5274	. 5165	. 9288	. 9270
19	. 9550	. 8218	. 0489	. 9616	. 1645	. 1119	. 3150	. 2876	. 5319	. 5213	. 9396	. 9378
20	9. 9564	9. 8241	0. 0506	9. 9640	0. 1667	0. 1146	0. 3179	0. 2909	0. 5365	0. 5261	0. 9506	0. 9489
21	. 9579	. 8264	. 0523	. 9664	. 1689	. 1173	. 3208	. 2942	. 5411	. 5309	. 9618	. 9603
22	. 9593	. 8287	. 0541	. 9687	. 1711	. 1200	. 3238	. 2975	. 5458	. 5358	. 9734	. 9719
23	. 9607	. 8310	. 0558	. 9711	. 1733	. 1226	. 3268	. 3008	. 5505	. 5407	. 9853	. 9839
24	. 9622	. 8333	. 0576	. 9735	. 1755	. 1253	. 3298	. 3041	. 5553	. 5457	. 9975	. 9961
25	9. 9636	9. 8356	0. 0593	9. 9760	0. 1777	0. 1280	0. 3328	0. 3075	0. 5601	0. 5507	1. 0100	1. 0087
26	. 9651	. 8379	. 0611	. 9784	. 1799	. 1308	. 3359	. 3109	. 5649	. 5557	. 0228	. 0216
27	. 9665	. 8402	. 0628	. 9808	. 1821	. 1335	. 3389	. 3143	. 5698	. 5608	. 0361	. 0350
28	. 9680	. 8425	. 0646	. 9832	. 1844	. 1362	. 3420	. 3177	. 5748	. 5660	. 0497	. 0487
29	. 9695	. 8448	. 0664	. 9856	. 1867	. 1389	. 3451	. 3211	. 5798	. 5712	. 0638	. 0628
30	9. 9709	9. 8471	0. 0682	9. 9880	0. 1889	0. 1417	0. 3482	0. 3245	0. 5848	0. 5764	1. 0783	1. 0774
31	. 9724	. 8494	. 0700	. 9904	. 1912	. 1444	. 3514	. 3280	. 5899	. 5817	. 0934	. 0925
32	. 9739	. 8517	. 0718	. 9929	. 1935	. 1472	. 3545	. 3315	. 5951	. 5871	. 1089	. 1081
33	. 9754	. 8540	. 0736	. 9953	. 1958	. 1499	. 3577	. 3350	. 6003	. 5925	. 1250	. 1242
34	. 9769	. 8563	. 0754	. 9977	. 1981	. 1527	. 3609	. 3385	. 6056	. 5979	. 1416	. 1409
35	9. 9784	9. 8586	0. 0772	0. 0002	0. 2004	0. 1555	0. 3641	0. 3420	0. 6110	0. 6034	1. 1590	1. 1583
36	. 9798	. 8609	. 0790	. 0026	. 2028	. 1582	. 3674	. 3456	. 6164	. 6090	. 1770	. 1764
37	. 9813	. 8632	. 0809	. 0051	. 2051	. 1610	. 3706	. 3491	. 6218	. 6147	. 1958	. 1952
38	. 9829	. 8655	. 0827	. 0075	. 2075	. 1638	. 3739	. 3527	. 6273	. 6204	. 2154	. 2149
39	. 9844	. 8678	. 0845	. 0100	. 2098	. 1667	. 3772	. 3563	. 6329	. 6261	. 2359	. 2354
40	9. 9859	9. 8701	0. 0864	0. 0124	0. 2122	0. 1695	0. 3805	0. 3599	0. 6386	0. 6319	1. 2573	1. 2569
41	. 9874	. 8724	. 0883	. 0149	. 2146	. 1723	. 3839	. 3636	. 6443	. 6378	. 2799	. 2795
42	. 9889	. 8748	. 0901	. 0173	. 2170	. 1751	. 3873	. 3673	. 6501	. 6438	. 3037	. 3033
43	. 9904	. 8771	. 0920	. 0198	. 2194	. 1780	. 3907	. 3710	. 6560	. 6498	. 3288	. 3285
44	. 9920	. 8794	. 0939	. 0223	. 2218	. 1808	. 3941	. 3747	. 6619	. 6559	. 3554	. 3552
45	9. 9935	9. 8817	0. 0958	0. 0248	0. 2243	0. 1837	0. 3975	0. 3784	0. 6679	0. 6621	1. 3837	1. 3835
46	. 9951	. 8840	. 0976	. 0272	. 2267	. 1866	. 4010	. 3822	. 6740	. 6684	. 4140	. 4138
47	. 9966	. 8863	. 0995	. 0297	. 2292	. 1895	. 4045	. 3859	. 6802	. 6747	. 4465	. 4463
48	. 9982	. 8887	. 1015	. 0322	. 2316	. 1924	. 4080	. 3897	. 6865	. 6811	. 4815	. 4814
49	. 9998	. 8910	. 1034	. 0347	. 2341	. 1953	. 4115	. 3936	. 6928	. 6876	. 5196	. 5195
50	0. 0013	9. 8933	0. 1053	0. 0372	0. 2366	0. 1982	0. 4151	0. 3974	0. 6993	0. 6942	1. 5613	1. 5612
51	. 0029	. 8956	. 1072	. 0397	. 2391	. 2011	. 4187	. 4013	. 7058	. 7008	. 6074	. 6073
52	. 0044	. 8980	. 1092	. 0422	. 2416	. 2040	. 4223	. 4052	. 7124	. 7076	. 6588	. 6587
53	. 0060	. 9003	. 1111	. 0447	. 2442	. 2070	. 4260	. 4091	. 7191	. 7144	. 7171	. 7171
54	. 0076	. 9026	. 1131	. 0473	. 2467	. 2099	. 4297	. 4130	. 7259	. 7214	. 7844	. 7843
55	0. 0092	9. 9050	0. 1150	0. 0498	0. 2493	0. 2129	0. 4334	0. 4170	0. 7328	0. 7284	1. 8638	1. 8638
56	. 0108	. 9073	. 1170	. 0523	. 2518	. 2159	. 4371	. 4210	. 7398	. 7355	. 9610	. 9610
57	. 0124	. 9096	. 1190	. 0548	. 2544	. 2189	. 4408	. 4250	. 7469	. 7428	2. 0863	2. 0863
58	. 0140	. 9120	. 1209	. 0574	. 2570	. 2219	. 4446	. 4291	. 7541	. 7501	. 2627	. 2627
59	. 0156	. 9143	. 1229	. 0599	. 2596	. 2249	. 4485	. 4331	. 7615	. 7576	2. 5640	2. 5640
60	0. 0172	9. 9167	0. 1249	0. 0625	0. 2623	0. 2279	0. 4523	0. 4372	0. 7689	0. 7652	*Inf.*	*Inf.*

TABLE 37A.

Equal Altitudes near Noon.

Factor E=$\left.\begin{matrix}\text{Sum}\\ \text{Diff.}\end{matrix}\right\}$ of numbers for LAT. and DEC. of $\left\{\begin{matrix}\text{Contrary}\\ \text{Same}\end{matrix}\right\}$ Names.

Latitude.										Declination.			
Lat.	N.	Lat.	N.	Lat.	N.	Lat.	N.	Lat.	N.	Dec.	N.	Dec.	N.
° ′		° ′		° ′		° ′		° ′		′		° ′	
0 0	.000	12 22	.060	23 41	.120	33 21	.180	41 16	.240	0 0	.000	12 28	.060
0 12	.001	12 34	.061	23 52	.121	33 30	.181	41 23	.241	0 12	.001	12 40	.061
0 25	.002	12 46	.062	24 2	.122	33 39	.182	41 30	.242	0 25	.002	12 52	.062
0 38	.003	12 58	.063	24 13	.123	33 47	.183	41 37	.243	0 38	.003	13 4	.063
0 50	.004	13 10	.064	24 23	.124	33 56	.184	41 44	.244	0 50	.004	13 16	.064
1 3	.005	13 22	.065	24 34	.125	34 4	.185	41 51	.245	1 3	.005	13 28	.065
1 15	.006	13 34	.066	24 44	.126	34 13	.186	41 58	.246	1 15	.006	13 40	.066
1 28	.007	13 46	.067	24 54	.127	34 22	.187	42 5	.247	1 28	.007	13 52	.067
1 41	.008	13 58	.068	25 5	.128	34 30	.188	42 12	.248	1 41	.008	14 4	.068
1 53	.009	14 10	.069	25 15	.129	34 39	.189	42 19	.249	1 54	.009	14 16	.069
2 6	.010	14 22	.070	25 25	.130	34 47	.190	42 26	.250	2 7	.010	14 28	.070
2 18	.011	14 33	.071	25 36	.131	34 56	.191	42 33	.251	2 19	.011	14 39	.071
2 31	.012	14 45	.072	25 46	.132	35 4	.192	42 39	.252	2 32	.012	14 51	.072
2 43	.013	14 57	.073	25 56	.133	35 12	.193	42 46	.253	2 44	.013	15 3	.073
2 56	.014	15 8	.074	26 6	.134	35 21	.194	42 53	.254	2 57	.014	15 15	.074
3 8	.015	15 20	.075	26 16	.135	35 29	.195	43 0	.255	3 10	.015	15 27	.075
3 21	.016	15 32	.076	26 26	.136	35 37	.196	43 6	.256	3 23	.016	15 39	.076
3 33	.017	15 43	.077	26 36	.137	35 46	.197	43 13	.257	3 35	.017	15 50	.077
3 46	.018	15 55	.078	26 46	.138	35 54	.198	43 20	.258	3 48	.018	16 2	.078
3 58	.019	16 7	.079	26 56	.139	36 2	.199	43 26	.259	4 0	.019	16 14	.079
4 11	.020	16 18	.080	27 6	.140	36 11	.200	43 33	.260	4 13	.020	16 26	.080
4 23	.021	16 30	.081	27 16	.141	36 19	.201	43 40	.261	4 25	.021	16 37	.081
4 36	.022	16 41	.082	27 26	.142	36 27	.202	43 46	.262	4 38	.022	16 48	.082
4 48	.023	16 53	.083	27 36	.143	36 35	.203	43 53	.263	4 51	.023	17 0	.083
5 1	.024	17 4	.084	27 46	.144	36 43	.204	43 59	.264	5 3	.024	17 11	.084
5 13	.025	17 16	.085	27 56	.145	36 51	.205	44 6	.265	5 16	.025	17 23	.085
5 26	.026	17 27	.086	28 6	.146	36 59	.206	44 12	.266	5 29	.026	17 35	.086
5 38	.027	17 39	.087	28 15	.147	37 7	.207	44 19	.267	5 41	.027	17 47	.087
5 51	.028	17 50	.088	28 25	.148	37 15	.208	44 25	.268	5 54	.028	17 58	.088
6 3	.029	18 1	.089	28 35	.149	37 23	.209	44 31	.269	6 7	.029	18 9	.089
6 16	.030	18 13	.090	28 44	.150	37 31	.210	44 38	.270	6 19	.030	18 21	.090
6 28	.031	18 24	.091	28 54	.151	37 39	.211	44 44	.271	6 31	.031	18 32	.091
6 40	.032	18 35	.092	29 4	.152	37 47	.212	44 51	.272	6 43	.032	18 43	.092
6 53	.033	18 47	.093	29 13	.153	37 55	.213	44 57	.273	6 56	.033	18 55	.093
7 5	.034	18 58	.094	29 23	.154	38 2	.214	45 3	.274	7 9	.034	19 6	.094
7 17	.035	19 9	.095	29 32	.155	38 10	.215	45 9	.275	7 21	.035	19 17	.095
7 30	.036	19 20	.096	29 42	.156	38 18	.216	45 16	.276	7 34	.036	19 28	.096
7 42	.037	19 32	.097	29 51	.157	38 26	.217	45 22	.277	7 46	.037	19 40	.097
7 55	.038	19 43	.098	30 1	.158	38 33	.218	45 28	.278	7 59	.038	19 51	.098
8 7	.039	19 54	.099	30 10	.159	38 41	.219	45 34	.279	8 11	.039	20 2	.099
8 19	.040	20 5	.100	30 20	.160	38 49	.220	45 40	.280	8 23	.040	20 13	.100
8 32	.041	20 16	.101	30 29	.161	38 56	.221	45 46	.281	8 36	.041	20 24	.101
8 44	.042	20 27	.102	30 38	.162	39 4	.222	45 52	.282	8 48	.042	20 35	.102
8 56	.043	20 38	.103	30 48	.163	39 11	.223	45 58	.283	9 0	.043	20 46	.103
9 8	.044	20 49	.104	30 57	.164	39 19	.224	46 5	.284	9 12	.044	20 57	.104
9 21	.045	21 0	.105	31 6	.165	39 26	.225	46 11	.285	9 25	.045	21 8	.105
9 33	.046	21 11	.106	31 15	.166	39 34	.226	46 17	.286	9 37	.046	21 19	.106
9 45	.047	21 22	.107	31 24	.167	39 41	.227	46 23	.287	9 50	.047	21 30	.107
9 57	.048	21 33	.108	31 34	.168	39 49	.228	46 29	.288	10 2	.048	21 41	.108
10 9	.049	21 44	.109	31 43	.169	39 56	.229	46 35	.289	10 14	.049	21 52	.109
10 22	.050	21 55	.110	31 52	.170	40 4	.230	46 41	.290	10 27	.050	22 3	.110
10 34	.051	22 5	.111	32 1	.171	40 11	.231	46 46	.291	10 39	.051	22 13	.111
10 46	.052	22 16	.112	32 10	.172	40 18	.232	46 52	.292	10 51	.052	22 24	.112
10 58	.053	22 27	.113	32 19	.173	40 26	.233	46 58	.293	11 3	.053	22 35	.113
11 10	.054	22 38	.114	32 28	.174	40 33	.234	47 4	.294	11 15	.054	22 46	.114
11 22	.055	22 48	.115	32 37	.175	40 40	.235	47 10	.295	11 27	.055	22 57	.115
11 34	.056	22 59	.116	32 46	.176	40 47	.236	47 16	.296	11 39	.056	23 8	.116
11 46	.057	23 10	.117	32 54	.177	40 55	.237	47 21	.297	11 51	.057	23 19	.117
11 58	.058	23 20	.118	33 3	.178	41 2	.238	47 27	.298	12 3	.058	23 29	.118
12 10	.059	23 31	.119	33 12	.179	41 9	.239	47 33	.299	12 16	.059	23 40	.119
12 22	.060	23 41	.120	33 21	.180	41 16	.240	47 39	.300	12 28	.060	23 50	.120

Equation of Equal Altitudes (sec.)=E×relative velocity of Ship and Sun (″ per hour).

TABLE 38.

Error in Longitude due to one minute Error of Latitude.

Sun's altitude.	Polar distance.	Latitude.																Polar distance.	Sun's altitude.
		0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°		
°	°	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	°	°
10	110	.4	.4	.4	.5	.5	.6	.7	.8	1.0	1.3	1.8	2.9					110	10
20		.4	.4	.5	.6	.7	.8	1.0	1.2	1.6	2.6								20
30		.4	.5	.6	.7	.9	1.1	1.5	2.3										30
40		.5	.6	.8	1.0	1.3													40
50		.7	.9	1.2															50
60		.9																	60
10	105	.3	.3	.3	.3	.4	.4	.5	.6	.8	.9	1.2	1.8	3.0				105	10
20		.3	.3	.4	.4	.5	.6	.7	.9	1.2	1.6	2.7							20
30		.3	.4	.5	.6	.7	.8	1.1	1.5	2.4									30
40		.4	.5	.6	.7	1.0	1.3												40
50		.4	.6	.8	1.2														50
60		.6	.9																60
15	100	.2	.2	.2	.3	.3	.4	.4	.5	.6	.8	1.1	1.6	2.9				100	15
20		.2	.2	.3	.3	.4	.5	.5	.7	.9	1.1	1.6	2.7						20
30		.2	.3	.3	.4	.5	.6	.8	1.1	1.5	2.4								30
40		.2	.3	.4	.6	.7	.9	1.3	2.1										40
50		.3	.4	.6	.8	1.2													50
60		.3	.6	.9															60
15	95	.1	.1	.1	.2	.2	.3	.3	.4	.5	.6	.8	1.1	1.7	3.0			95	15
20		.1	.1	.2	.2	.3	.3	.4	.5	.6	.8	1.1	1.6	2.8					20
30		.1	.2	.2	.3	.4	.5	.6	.8	1.0	1.5	2.5							30
40		.1	.2	.3	.4	.5	.7	.9	1.3	2.1									40
50		.1	.3	.4	.6	.8	1.1												50
60		.2	.3	.6	.9														60
20	90	.0	.0	.1	.1	.1	.2	.2	.3	.4	.6	.7	1.1	1.6	3.0			90	20
30		.0	.1	.1	.2	.2	.3	.4	.5	.7	1.0	1.5	2.7						30
40		.0	.1	.2	.3	.3	.5	.6	.9	1.3	2.2								40
50		.0	.1	.2	.4	.5	.8	1.1											50
60		.0	.2	.3	.5	.9													60
70		.0	.2	.6	1.1														70
20	85	.1*	.1*	.0	.0	.0	.1	.1	.2	.3	.3	.5	.7	1.0	1.6	3.1		85	20
30		.1*	.0	.0	.1	.1	.2	.2	.4	.5	.7	1.0	1.5	2.7					30
40		.1*	.0	.0	.1	.2	.3	.4	.6	.9	1.3	2.3							40
50		.1*	.0	.1	.2	.3	.5	.7	1.1										50
60		.2*	.0	.1	.3	.5	.9												60
70		.3*	.0	.2	.6	1.1													70
20	80	.2*	.2*	.1*	.1*	.1*	.0	.0	.0	.1	.1	.2	.4	.5	.9	1.5	3.1	80	20
30		.2*	.2*	.1*	.0	.0	.1	.1	.2	.3	.4	.6	.9	1.5	2.8				30
40		.2*	.2*	.1*	.0	.1	.2	.3	.4	.6	.9	1.3	2.4						40
50		.3*	.2*	.1*	.1	.2	.3	.5	.7	1.1									50
60		.4*	.2*	.0	.1	.3	.5	.9											60
70		.6*	.3*	.0	.2	.6	1.2												70
20	75	.3*	.3*	.2*	.2*	.2*	.1*	.1*	.1*	.1*	.0	.0	.1	.2	.3	.6	1.2	75	20
30		.3*	.3*	.2*	.2*	.1*	.1*	.0	.1	.1	.2	.4	.6	.9	1.5	3.0			30
40		.4*	.3*	.2*	.1*	.1*	.0	.1	.2	.4	.5	.8	1.3	2.5					40
50		.4*	.3*	.2*	.1*	.0	.1	.3	.5	.7	1.1								50
60		.6*	.4*	.2*	.1*	.1	.3	.5	.9										60
70		1.2*	.6*	.3*	.0	.2	.6	1.2											70
20	70	.4*	.4*	.3*	.3*	.3*	.3*	.2*	.2*	.2*	.2*	.2*	.2*	.2*	.2*	.2*	.2*	70	20
30		.4*	.4*	.3*	.3*	.2*	.2*	.1*	.1*	.0	.0	.1	.2	.6	.8	1.5	3.1		30
40		.5*	.4*	.3*	.3*	.2*	.1*	.0	.1	.2	.3	.5	.8	1.3	2.6				40
50		.6*	.5*	.3*	.2*	.2*	.0	.1	.3	.4	.7	1.1							50
60		.9*	.6*	.4*	.3*	.1*	.1	.2	.5	.9									60
70			1.2*	.6*	.3*	.1*	.2	.6	1.2										70
Sun's altitude.	Polar distance.	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	Polar distance.	Sun's altitude.
		Latitude.																	

TABLE 39.

Amplitudes.

Lati- tude.	Declination.													
	0°.0	0°.5	1°.0	1°.5	2°.0	2°.5	3°.0	3°.5	4°.0					
°	°	°	°	°	°	°	°	°	°					
0	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.					
10	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.					
15	0.0	0.5	1.0	1.5	2.1	2.6	3.1	3.6	4.					
20	0.0	0.5	1.1	1.6	2.1	2.7	3.2	3.7	4.					
25	0.0	0.5	1.1	1.6	2.2	2.8	3.3	3.8	4.					
30	0.0	0.6	1.2	1.7	2.3	2.9	3.4	4.0	4.					
32	0.0	0.6	1.2	1.8	2.4	2.9	3.5	4.1	4.					
34	0.0	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.					
36	0.0	0.6	1.2	1.8	2.5	3.1	3.7	4.3	4.					
38	0.0	0.6	1.3	1.9	2.5	3.2	3.8	4.4	5.					
40	0.0	0.7	1.3	2.0	2.6	3.3	3.9	4.6	5.					
42	0.0	0.7	1.3	2.0	2.7	3.4	4.0	4.7	5.					
44	0.0	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.					
46	0.0	0.7	1.4	2.2	2.9	3.6	4.3	5.0	5.					
48	0.0	0.7	1.5	2.2	3.0	3.7	4.5	5.2	6.					
50	0.0	0.8	1.5	2.3	3.1	3.9	4.7	5.4	6.					
51	0.0	0.8	1.6	2.4	3.2	4.0	4.8	5.6	6.					
52	0.0	0.8	1.6	2.4	3.3	4.1	4.9	5.7	6.					
53	0.0	0.8	1.6	2.5	3.3	4.2	5.0	5.8	6.					
54	0.0	0.9	1.7	2.5	3.4	4.3	5.1	6.0	6.					
55	0.0	0.9	1.7	2.6	3.5	4.4	5.2	6.1	7.					
56	0.0	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.					
57	0.0	0.9	1.8	2.7	3.7	4.6	5.5	6.4	7.					
58	0.0	0.9	1.9	2.8	3.8	4.7	5.7	6.6	7.					
59	0.0	1.0	1.9	2.9	3.9	4.9	5.8	6.8	7.					
60	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.					
61	0.0	1.0	2.1	3.1	4.1	5.2	6.2	7.2	8.					
62	0.0	1.1	2.1	3.2	4.3	5.3	6.4	7.5	8.					
63	0.0	1.1	2.2	3.3	4.5	5.5	6.6	7.7	8.					
64	0.0	1.1	2.3	3.4	4.6	5.7	6.9	8.0	9.					
65.0	0.0	1.2	2.4	3.5	4.8	5.9	7.1	8.3	9.					
5.5	0.0	1.2	2.4	3.6	4.8	6.0	7.2	8.5	9.					
6.0	0.0	1.2	2.5	3.7	4.9	6.1	7.4	8.6	9.					
6.5	0.0	1.2	2.5	3.8	5.0	6.3	7.5	8.8	10.					
7.0	0.0	1.3	2.6	3.8	5.1	6.4	7.7	9.0	0.					
67.5	0.0	1.3	2.6	3.9	5.2	6.5	7.9	9.2	10.5					
8.0	0.0	1.3	2.7	4.0	5.3	6.7	8.0	9.4	0.7					
8.5	0.0	1.4	2.7	4.1	5.4	6.8	8.2	9.6	1.0					
9.0	0.0	1.4	2.8	4.2	5.5	7.0	8.4	9.8	1.2					
9.5	0.0	1.4	2.9	4.3	5.7	7.2	8.6	10.0	1.5					
70.0	0.0	1.5	2.9	4.4	5.8	7.3	8.8	10.3	11.8	13.3	14.8	16.3	17.8	70.0
0.5	0.0	1.5	3.0	4.5	6.0	7.5	9.0	0.5	2.1	3.6	5.1	6.7	8.2	0.5
1.0	0.0	1.5	3.1	4.6	6.2	7.7	9.3	0.8	2.4	3.9	5.5	7.1	8.7	1.0
1.5	0.0	1.6	3.2	4.7	6.3	7.9	9.5	1.1	2.7	4.3	5.9	7.8	9.2	1.5
2.0	0.0	1.6	3.2	4.9	6.5	8.1	9.8	1.4	3.0	4.7	6.4	8.1	9.8	2.0
72.5	0.0	1.7	3.3	5.0	6.7	8.3	10.0	11.7	13.4	15.1	16.9	18.6	20.3	72.5
3.0	0.0	1.7	3.4	5.1	6.9	8.6	0.3	2.0	3.8	5.5	7.4	9.1	0.9	3.0
3.5	0.0	1.8	3.5	5.2	7.1	8.8	0.6	2.4	4.2	6.0	7.9	9.7	1.6	3.5
4.0	0.0	1.8	3.6	5.4	7.3	9.1	0.9	2.8	4.6	6.5	8.4	20.3	2.3	4.0
4.5	0.0	1.9	3.7	5.6	7.5	9.4	1.3	3.2	5.1	7.1	9.0	1.0	3.0	4.5
75.0	0.0	1.9	3.8	5.8	7.7	9.7	11.7	13.6	15.6	17.7	19.7	21.7	23.8	75.0
5.5	0.0	2.0	3.9	6.0	8.0	10.0	2.1	4.1	6.2	8.3	20.4	2.5	4.7	5.5
6.0	0.0	2.1	4.0	6.2	8.3	0.4	2.5	4.6	6.8	8.9	1.1	3.3	5.6	6.0
6.5	0.0	2.1	4.2	6.4	8.6	0.8	3.0	5.2	7.4	9.6	1.9	4.2	6.6	6.5
7.0	0.0	2.2	4.4	6.6	8.9	1.2	3.5	5.8	8.1	20.4	2.8	5.2	7.7	7.0

TABLE 39.

Amplitudes.

Latitude.	Declination.													Latitude.
	6°.0	6°.5	7°.0	7°.5	8°.0	8°.5	9°.0	9°.5	10°.0	10°.5	11°.0	11°.5	12°.0	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
0	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	0
10	6.1	6.6	7.1	7.6	8.1	8.6	9.1	9.7	0.1	0.7	1.2	1.7	2.2	10
15	6.2	6.7	7.2	7.8	8.3	8.8	9.3	9.8	0.4	0.9	1.4	1.9	2.5	15
20	6.4	6.9	7.4	8.0	8.5	9.1	9.6	10.1	0.7	1.2	1.7	2.3	2.8	20
25	6.6	7.1	7.7	8.3	8.8	9.4	9.9	0.5	1.1	1.6	2.2	2.8	3.3	25
30	6.9	7.5	8.1	8.7	9.3	9.8	10.4	11.0	11.5	12.1	12.7	13.3	13.9	30
32	7.0	7.7	8.3	8.8	9.5	10.0	0.6	1.2	1.8	2.4	3.0	3.6	4.2	32
34	7.2	7.8	8.5	9.0	9.7	0.3	0.8	1.5	2.1	2.7	3.3	3.9	4.5	34
36	7.4	8.0	8.7	9.3	9.9	0.5	1.1	1.8	2.4	3.0	3.6	4.3	4.9	36
38	7.6	8.2	8.9	9.5	10.2	0.8	1.4	2.1	2.7	3.4	4.0	4.7	5.3	38
40	7.8	8.5	9.1	9.8	10.5	11.1	11.7	12.4	13.1	13.8	14.4	15.1	15.7	40
42	8.0	8.8	9.4	10.1	0.8	1.5	2.1	2.8	3.5	4.2	4.8	5.6	6.2	42
44	8.3	9.1	9.7	0.5	1.1	1.9	2.5	3.3	4.0	4.7	5.3	6.1	6.8	44
46	8.6	9.4	10.1	0.8	1.5	2.3	3.0	3.8	4.5	5.2	5.9	6.7	7.4	46
48	9.0	9.7	0.5	1.2	2.0	2.8	3.5	4.3	5.0	5.8	6.6	7.3	8.1	48
50	9.3	10.1	10.9	11.7	12.5	13.3	14.1	14.9	15.7	16.5	17.3	18.1	18.9	50
51	9.5	0.4	1.2	2.0	2.8	3.6	4.4	5.2	6.0	6.8	7.7	8.5	9.3	51
52	9.7	0.6	1.4	2.2	3.1	3.9	4.7	5.6	6.4	7.2	8.1	8.9	9.7	52
53	10.0	0.8	1.7	2.5	3.4	4.2	5.1	5.9	6.8	7.6	8.5	9.4	20.2	53
54	0.2	1.1	2.0	2.8	3.7	4.6	5.4	6.3	7.2	8.1	8.9	9.8	0.7	54
55	10.5	11.4	12.3	13.1	14.0	14.9	15.8	16.7	17.6	18.5	19.4	20.3	21.2	55
56	0.8	1.7	2.6	3.5	4.4	5.3	6.2	7.2	8.1	9.0	9.9	0.9	1.8	56
57	1.1	2.0	2.9	3.9	4.8	5.8	6.7	7.7	8.6	9.6	20.5	1.5	2.4	57
58	1.4	2.3	3.3	4.3	5.2	6.2	7.2	8.2	9.1	20.1	1.1	2.1	3.1	58
59	1.7	2.7	3.7	4.7	5.7	6.7	7.7	8.7	9.7	0.7	1.7	2.8	3.8	59
60	12.1	13.1	14.1	15.1	16.2	17.2	18.2	19.3	20.3	21.4	22.4	23.5	24.6	60
61	2.5	3.5	4.6	5.6	6.7	7.8	8.8	9.9	1.0	2.1	3.1	4.3	5.4	61
62	2.9	3.9	5.1	6.1	7.3	8.4	9.4	20.6	1.7	2.9	3.9	5.2	6.3	62
63	3.4	4.4	5.6	6.7	7.9	9.0	20.1	1.3	2.5	3.7	4.8	6.1	7.2	63
64	3.9	5.0	6.2	7.3	8.5	9.7	0.9	2.1	3.3	4.6	5.7	7.1	8.3	64
65.0	14.4	15.5	16.8	18.0	19.3	20.5	21.7	23.0	24.2	25.6	26.8	28.2	29.5	65.0
5.5	4.6	5.8	7.1	8.3	9.6	0.9	2.2	3.5	4.7	6.1	7.4	8.7	30.1	5.5
6.0	4.9	6.2	7.4	8.7	20.0	1.3	2.6	3.9	5.3	6.6	8.0	9.3	0.7	6.0
6.5	5.2	6.5	7.8	9.1	0.4	1.8	3.1	4.4	5.8	7.2	8.6	30.0	1.4	6.5
7.0	5.5	6.8	8.2	9.5	0.9	2.2	3.6	5.0	6.4	7.8	9.2	0.7	2.1	7.0
67.5	15.9	17.2	18.6	19.9	21.3	22.7	24.1	25.5	27.0	28.4	29.9	31.4	32.9	67.5
8.0	6.2	7.6	9.0	20.4	1.8	3.2	4.7	6.1	7.6	9.1	30.6	2.2	3.7	8.0
8.5	6.6	8.0	9.4	0.9	2.3	3.8	5.3	6.8	8.3	9.8	1.4	3.0	4.6	8.5
9.0	7.0	8.4	9.9	1.4	2.8	4.4	5.9	7.4	9.0	30.6	2.2	3.8	5.5	9.0
9.5	7.4	8.9	20.4	1.9	3.4	5.0	6.5	8.1	9.7	1.4	3.0	4.7	6.4	9.5
70.0	17.8	19.3	20.9	22.4	24.0	25.6	27.2	28.8	30.5	32.2	33.9	35.7	37.4	70.0
0.5	8.2	9.8	1.4	3.0	4.6	6.3	7.9	9.6	1.3	3.1	4.9	6.7	8.5	0.5
1.0	8.7	20.3	2.0	3.6	5.3	7.0	8.7	30.5	2.2	4.0	5.9	7.8	9.7	1.0
1.5	9.2	0.9	2.6	4.3	6.0	7.8	9.5	1.4	3.2	5.0	7.0	8.9	40.9	1.5
2.0	9.8	1.5	3.2	5.0	6.8	8.6	30.4	2.3	4.2	6.1	8.1	40.2	2.3	2.0
72.5	20.3	22.1	23.9	25.7	27.6	29.5	31.4	33.3	35.3	37.3	39.4	41.5	43.7	72.5
3.0	0.9	2.8	4.6	6.5	8.4	30.4	2.4	4.4	6.5	8.6	40.8	3.0	5.3	3.0
3.5	1.6	3.5	5.4	7.4	9.3	1.4	3.4	5.5	7.7	9.9	2.2	4.6	7.0	3.5
4.0	2.3	4.3	6.2	8.3	30.3	2.5	4.6	6.8	9.1	41.4	3.8	6.3	8.9	4.0
4.5	3.0	5.1	7.1	9.3	1.4	3.6	5.8	8.2	40.5	3.0	5.6	8.2	51.1	4.5
75.0	23.8	26.0	28.1	30.3	32.5	34.8	37.2	39.6	42.1	44.8	47.5	50.4	53.5	75.0
5.5	4.7	6.9	9.1	1.4	3.8	6.2	8.7	41.2	3.9	6.7	9.6	2.8	6.2	5.5
6.0	5.6	7.9	30.2	2.6	5.1	7.7	40.3	3.0	5.9	8.9	52.1	5.5	9.3	6.0
6.5	6.6	9.0	1.4	4.0	6.6	9.3	2.1	5.0	8.1	51.3	4.8	8.7	63.0	6.5
7.0	7.7	30.2	2.8	5.5	8.2	41.1	4.1	7.2	50.5	4.1	8.0	62.4	7.6	7.0

TABLE 39.

Amplitudes.

Latitude.	Declination.													Latitude.
	12°.0	12°.5	13°.0	13°.5	14°.0	14°.5	15°.0	15°.5	16°.0	16°.5	17°.0	17°.5	18°.0	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
0	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0	0
10	2.2	2.7	3.2	3.7	4.2	4.7	5.3	5.8	6.3	6.8	7.3	7.9	8.3	10
15	2.5	2.9	3.5	4.0	4.5	5.0	5.6	6.1	6.6	7.1	7.7	8.2	8.7	15
20	2.8	3.3	3.8	4.4	4.9	5.5	6.0	6.5	7.1	7.6	8.1	8.7	9.2	20
25	3.3	3.8	4.4	4.9	5.5	6.1	6.6	7.1	7.7	8.3	8.8	9.4	9.9	25
30	13.9	14.5	15.0	15.6	16.2	16.8	17.4	18.0	18.6	19.2	19.7	20.3	20.9	30
32	4.2	4.8	5.3	6.0	6.6	7.2	7.8	8.4	9.0	9.6	20.2	0.8	1.4	32
34	4.5	5.1	5.7	6.4	7.0	7.6	8.2	8.8	9.5	20.0	0.7	1.3	1.9	34
36	4.9	5.5	6.1	6.8	7.4	8.0	8.7	9.3	20.0	0.5	1.2	1.8	2.5	36
38	5.3	6.0	6.6	7.2	7.9	8.5	9.2	9.8	0.5	1.1	1.8	2.4	3.1	38
40	15.7	16.4	17.1	17.8	18.4	19.1	19.7	20.4	21.1	21.8	22.4	23.1	23.8	40
41	6.0	6.7	7.3	8.0	8.7	9.4	20.0	0.8	1.4	2.1	2.8	3.5	4.2	41
42	6.2	6.9	7.6	8.3	9.0	9.7	0.4	1.1	1.8	2.5	3.2	3.9	4.6	42
43	6.5	7.2	7.9	8.6	9.3	20.0	0.7	1.4	2.2	2.9	3.6	4.3	5.0	43
44	6.8	7.5	8.2	8.9	9.6	0.4	1.1	1.8	2.6	3.3	4.0	4.7	5.4	44
45	17.1	17.8	18.5	19.3	20.0	20.7	21.5	22.2	23.0	23.7	24.4	25.2	25.9	45
46	7.4	8.2	8.9	9.6	0.4	1.1	1.9	2.6	3.4	4.1	4.9	5.7	6.4	46
47	7.7	8.5	9.3	20.0	0.8	1.5	2.3	3.1	3.8	4.6	5.4	6.2	6.9	47
48	8.1	8.9	9.7	0.4	1.2	2.0	2.8	3.6	4.3	5.1	5.9	6.7	7.5	48
49	8.5	9.3	20.1	0.8	1.6	2.4	3.2	4.1	4.9	5.7	6.5	7.3	8.1	49
50	18.9	19.7	20.5	21.3	22.1	22.9	23.7	24.6	25.4	26.2	27.0	27.9	28.7	50
51	9.3	20.1	0.9	1.8	2.6	3.5	4.3	5.1	6.0	6.8	7.6	8.5	9.4	51
52	9.7	0.6	1.4	2.3	3.1	4.0	4.9	5.7	6.6	7.5	8.3	9.2	30.1	52
53	20.2	1.1	1.9	2.8	3.7	4.6	5.5	6.4	7.3	8.2	9.0	30.0	0.9	53
54	0.7	1.6	2.5	3.4	4.3	5.2	6.1	7.1	8.0	8.9	9.8	0.8	1.7	54
55	21.2	22.2	23.1	24.0	24.9	25.9	26.8	27.8	28.7	29.7	30.6	31.6	32.6	55
56	1.8	2.8	3.7	4.7	5.6	6.6	7.6	8.6	9.5	30.5	1.5	2.5	3.6	56
57	2.4	3.4	4.4	5.4	6.4	7.4	8.4	9.4	30.4	1.4	2.5	3.5	4.6	57
58	3.1	4.1	5.1	6.1	7.2	8.2	9.2	30.3	1.3	2.4	3.5	4.6	5.7	58
59	3.8	4.8	5.9	6.9	8.0	9.1	30.2	1.3	2.3	3.5	4.6	5.7	6.9	59
60	24.6	25.6	26.7	27.8	28.9	30.1	31.2	32.3	33.4	34.6	35.8	36.9	38.2	60
61	5.4	6.5	7.6	8.8	9.9	1.1	2.2	3.5	4.6	5.8	7.1	8.3	9.6	61
62	6.3	7.5	8.6	9.8	31.0	2.2	3.4	4.7	5.9	7.2	8.5	9.8	41.2	62
63	7.2	8.5	9.7	31.0	2.2	3.5	4.7	6.1	7.4	8.7	40.1	41.5	2.9	63
64	8.3	9.6	30.9	2.2	3.5	4.8	6.2	7.6	9.0	40.4	1.8	3.3	4.8	64
65.0	29.5	30.8	32.2	33.5	34.9	36.3	37.8	39.2	40.7	42.2	43.8	45.4	47.0	65.0
5.5	30.1	1.5	2.9	4.3	5.7	7.1	8.6	40.1	1.6	3.2	4.8	6.5	8.2	5.5
6.0	0.7	2.2	3.6	5.0	6.5	8.0	9.5	1.1	2.7	4.3	5.9	7.7	9.4	6.0
6.5	1.4	2.9	4.3	5.8	7.3	8.9	40.5	2.1	3.8	5.4	7.1	8.9	50.8	6.5
7.0	2.1	3.6	5.1	6.7	8.2	9.8	1.5	3.2	4.9	6.6	8.4	50.3	2.3	7.0
67.5	32.9	34.4	36.0	37.6	39.2	40.8	42.6	44.3	46.1	47.9	49.8	51.8	53.9	67.5
8.0	3.7	5.3	6.9	8.6	40.2	1.9	3.7	5.5	7.4	9.3	51.3	3.4	5.6	8.0
8.5	4.6	6.2	7.9	9.6	1.3	3.1	4.9	6.8	8.8	50.8	2.9	5.1	7.5	8.5
9.0	5.5	7.2	8.9	40.7	2.5	4.3	6.2	8.2	50.3	2.4	4.6	7.0	9.6	9.0
9.5	6.4	8.2	40.0	1.8	3.7	5.6	7.6	9.7	1.9	4.2	6.5	9.1	61.9	9.5
70.0	37.4	39.3	41.1	43.0	45.0	47.0	49.2	51.4	53.7	56.1	58.7	61.5	64.6	70.0
0.5	8.5	40.4	2.4	4.4	6.4	8.6	50.8	3.2	5.7	8.3	61.1	4.3	7.8	0.5
1.0	9.7	1.7	3.7	5.8	8.0	50.3	2.6	5.2	7.9	60.7	3.9	7.5	71.7	1.0
1.5	40.9	3.0	5.1	7.4	9.7	2.1	4.6	7.4	60.3	3.5	7.1	71.4	6.9	1.5
2.0	2.3	4.4	6.7	9.1	51.5	4.1	6.9	9.9	3.1	6.8	71.1	6.7	90.0	2.0
72.5	43.7	46.0	48.4	50.9	53.6	56.4	59.4	62.7	66.4	70.9	76.5	90.0		72.5
3.0	5.3	7.7	50.3	3.0	5.9	8.9	62.2	6.1	70.6	6.3	90.0			3.0
3.5	7.0	9.6	2.3	5.3	8.4	61.8	5.6	70.3	6.1	90.0				3.5
4.0	8.9	51.7	4.7	7.9	61.4	5.3	9.8	75.9	90.0					4.0
4.5	51.1	4.1	7.3	60.9	4.9	9.5	75.5	90.0						4.5

TABLE 39.

Amplitudes.

Latitude.	Declination.													Latitude.
	18°.0	18°.5	19°.0	19°.5	20°.0	20°.5	21°.0	21°.5	22°.0	22°.5	23°.0	23°.5	24°.0	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
0	18.0	18.5	19.0	19.5	20.0	20.5	21.0	21.5	22.0	22.5	23.0	23.5	24.0	0
10	8.3	8.8	9.3	9.8	0.3	0.8	1.3	1.8	2.3	2.9	3.4	3.9	4.4	10
15	8.7	9.2	9.7	20.2	0.7	1.3	1.8	2.3	2.8	3.3	3.9	4.4	4.9	15
20	9.2	9.7	20.3	0.8	1.4	1.9	2.4	3.0	3.5	4.0	4.6	5.1	5.7	20
25	9.9	20.5	1.1	1.6	2.2	2.7	3.3	3.9	4.4	5.0	5.5	6.1	6.7	25
30	20.9	21.5	22.1	22.7	23.3	23.8	24.4	25.0	25.6	26.2	26.8	27.4	28.0	30
32	1.4	2.0	2.6	3.2	3.8	4.4	5.0	5.6	6.2	6.8	7.4	8.0	8.7	32
34	1.9	2.5	3.1	3.8	4.4	5.0	5.6	6.2	6.9	7.5	8.1	8.7	9.4	34
36	2.5	3.1	3.7	4.4	5.0	5.7	6.3	6.9	7.6	8.2	8.9	9.5	30.2	36
38	3.1	3.8	4.4	5.1	5.7	6.4	7.0	7.7	8.4	9.1	9.7	30.4	1.1	38
40	23.9	24.4	25.1	25.8	26.5	27.2	27.9	28.6	29.3	30.0	30.7	31.3	32.1	40
41	4.2	4.8	5.5	6.2	6.9	7.7	8.3	9.1	9.8	0.5	1.2	1.8	2.6	41
42	4.6	5.3	6.0	6.7	7.4	8.1	8.8	9.6	30.3	1.0	1.7	2.4	3.2	42
43	5.0	5.7	6.4	7.2	7.9	8.6	9.3	30.1	0.8	1.6	2.3	3.0	3.8	43
44	5.4	6.2	6.9	7.7	8.4	9.1	9.8	0.6	1.4	2.2	2.9	3.6	4.4	44
45	25.9	26.7	27.4	28.2	28.9	29.7	30.4	31.2	32.0	32.8	33.5	34.3	35.1	45
46	6.4	7.2	7.9	8.7	9.5	30.3	1.0	1.8	2.6	3.4	4.2	5.0	5.8	46
47	6.9	7.7	8.5	9.3	30.1	0.9	1.7	2.5	3.3	4.1	4.9	5.7	6.6	47
48	7.5	8.3	9.1	9.9	0.7	1.6	2.4	3.2	4.0	4.9	5.7	6.5	7.4	48
49	8.1	8.9	9.7	30.6	1.4	2.3	3.1	4.0	4.8	5.7	6.5	7.4	8.3	49
50	28.7	29.6	30.4	31.3	32.1	33.0	33.9	34.8	35.6	36.5	37.4	38.3	39.2	50
51	9.4	30.3	1.1	2.0	2.9	3.8	4.7	5.6	6.5	7.4	8.4	9.3	40.2	51
52	30.1	1.0	1.9	2.8	3.7	4.7	5.6	6.5	7.5	8.4	9.4	40.3	1.3	52
53	0.9	1.8	2.7	3.7	4.6	5.6	6.6	7.5	8.5	9.5	40.5	1.4	2.5	53
54	1.7	2.7	3.6	4.6	5.6	6.6	7.6	8.6	9.6	40.6	1.7	2.6	3.8	54
55	32.6	33.6	34.6	35.6	36.6	37.6	38.7	39.7	40.8	41.9	42.9	44.0	45.2	55
56	3.6	4.6	5.6	6.7	7.7	8.8	9.8	41.0	2.1	3.2	4.3	5.4	6.7	56
57	4.6	5.6	6.7	7.8	8.9	40.0	41.1	2.3	3.5	4.6	5.8	7.0	8.3	57
58	5.7	6.8	7.9	9.1	40.2	1.4	2.5	3.8	5.0	6.2	7.5	8.8	50.1	58
59	6.9	8.0	9.2	40.4	1.6	2.8	4.1	5.4	6.7	8.0	9.3	50.7	2.2	59
60.0	38.2	39.4	40.6	41.9	43.2	44.5	45.8	47.2	48.6	49.9	51.4	52.9	54.4	60.0
0.5	8.9	40.1	1.4	2.7	4.0	5.4	6.7	8.1	9.6	51.0	2.5	4.1	5.7	0.5
1.0	9.6	0.9	2.2	3.5	4.9	6.3	7.7	9.1	50.6	2.1	3.7	5.3	7.0	1.0
1.5	40.4	1.7	3.0	4.4	5.8	7.3	8.7	50.2	1.7	3.3	5.0	6.7	8.5	1.5
2.0	1.2	2.5	3.9	5.3	6.8	8.3	9.8	1.3	2.9	4.6	6.3	8.1	60.0	2.0
62.5	42.0	43.4	44.9	46.3	47.8	49.4	51.0	52.6	54.2	56.0	57.8	59.7	61.7	62.5
3.0	2.9	4.3	5.9	7.4	8.9	50.5	2.2	3.9	5.6	7.5	9.4	61.4	3.6	3.0
3.5	3.8	5.3	6.9	8.5	50.1	1.7	3.5	5.3	7.1	9.1	61.1	3.4	5.7	3.5
4.0	4.8	6.4	8.0	9.7	1.3	3.0	4.9	6.7	8.7	60.7	3.0	5.5	8.1	4.0
4.5	5.9	7.5	9.2	50.9	2.6	4.5	6.4	8.4	60.5	2.8	5.2	7.8	70.9	4.5
65.0	47.0	48.7	50.4	52.2	54.0	56.0	58.0	60.2	62.5	64.9	67.6	70.6	74.4	65.0
5.5	8.2	50.0	1.8	3.6	5.6	7.6	9.8	2.2	4.7	7.3	70.4	4.1	8.9	5.5
6.0	9.4	1.3	3.2	5.1	7.3	9.4	61.8	4.4	7.1	70.2	3.8	8.6	90.0	6.0
6.5	50.8	2.7	4.7	6.8	9.1	61.4	4.0	6.8	70.0	3.7	8.4	90.0		6.5
7.0	2.3	4.3	6.4	8.7	61.1	3.7	6.5	9.8	3.5	8.3	90.0			7.0
67.5	53.9	56.0	58.3	60.7	63.4	66.2	69.5	73.3	78.2	90.0				67.5
8.0	5.6	7.9	60.3	3.0	5.9	9.2	73.0	8.1	90.0					8.0
8.5	7.5	60.0	2.6	5.6	8.9	72.8	7.9	90.0						8.5
9.0	9.6	2.3	5.3	8.7	72.7	7.7	90.0							9.0
9.5	61.9	5.0	8.4	72.4	7.6	90.0								9.5
70.0	64.6	69.1	72.2	77.4	90.0									70.0
0.5	7.8	71.9	7.2	90.0										0.5
1.0	71.7	7.1	90.0											1.0
1.5	6.9	90.0												1.5
2.0	90.0													2.0

TABLE 39.

Amplitudes.

Latitude.	Declination.													Latitude.
	24°.0	24°.5	25°.0	25°.5	26°.0	26°.5	27°.0	27°.5	28°.0	28°.5	29°.0	29°.5	30°.0	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
0	24.0	24.5	25.0	25.5	26.0	26.5	27.0	27.5	28.0	28.5	29.0	29.5	30.0	0
4	4.1	4.6	5.1	5.6	6.1	6.6	7.1	7.6	8.1	8.6	9.1	9.6	0.1	4
8	4.3	4.8	5.3	5.8	6.3	6.8	7.3	7.8	8.3	8.8	9.3	9.8	0.3	8
12	4.6	5.1	5.6	6.1	6.6	7.1	7.6	8.1	8.7	9.2	9.7	30.2	0.7	12
16	5.0	5.6	6.1	6.6	7.1	7.6	8.2	8.7	9.2	9.8	30.3	0.8	1.3	16
20	25.7	26.2	26.7	27.3	27.8	28.3	28.9	29.4	30.0	30.5	31.1	31.6	32.1	20
22	6.0	6.6	7.1	7.7	8.2	8.8	9.3	9.9	0.4	1.0	1.5	2.1	2.6	22
24	6.4	7.0	7.6	8.1	8.7	9.2	9.8	30.4	0.9	1.5	2.0	2.6	3.2	24
26	6.9	7.5	8.1	8.6	9.2	9.7	30.3	0.9	1.5	2.1	2.6	3.2	3.8	26
28	7.4	8.0	8.6	9.2	9.8	30.3	0.9	1.5	2.1	2.7	3.3	3.9	4.5	28
30	28.0	28.6	29.2	29.8	30.4	31.0	31.6	32.2	32.8	33.4	34.0	34.7	35.3	30
31	8.3	8.9	9.5	30.1	0.8	1.4	2.0	2.6	3.2	3.8	4.5	5.1	5.7	31
32	8.7	9.3	9.9	0.5	1.1	1.7	2.4	3.0	3.6	4.2	4.9	5.5	6.1	32
33	9.0	9.6	30.2	0.9	1.5	2.1	2.8	3.4	4.0	4.7	5.3	6.0	6.6	33
34	9.4	30.0	0.6	31.3	1.9	2.6	3.2	3.8	4.5	5.1	5.8	6.4	7.1	34
35	29.8	30.4	31.1	31.7	32.3	33.0	33.6	34.3	35.0	35.6	36.3	36.9	37.6	35
36	30.2	0.8	1.5	2.1	2.8	3.5	4.1	4.8	5.5	6.1	6.8	7.5	8.2	36
37	0.6	1.3	1.9	2.6	3.3	4.0	4.6	5.3	6.0	6.7	7.4	8.1	8.8	37
38	1.1	1.7	2.4	3.1	3.8	4.5	5.2	5.9	6.6	7.3	8.0	8.7	9.4	38
39	1.6	2.2	2.9	3.6	4.3	5.0	5.7	6.5	7.2	7.9	8.6	9.3	40.0	39
40	32.1	32.8	33.5	34.2	34.9	35.6	36.3	37.1	37.8	38.5	39.3	40.0	40.7	40
41	2.6	3.3	4.1	4.8	5.5	6.2	7.0	7.7	8.5	9.2	40.0	0.7	1.5	41
42	3.2	3.9	4.7	5.4	6.1	6.9	7.7	8.4	9.2	9.9	0.7	1.5	2.3	42
43	3.8	4.5	5.3	6.1	6.8	7.6	8.4	9.2	9.9	40.7	1.5	2.3	3.1	43
44	4.4	5.2	6.0	6.8	7.5	8.3	9.1	40.0	40.7	1.6	2.4	3.2	4.0	44
45	35.1	35.9	36.7	37.5	38.3	39.1	39.9	40.8	41.6	42.5	43.3	44.1	45.0	45
46	5.8	6.6	7.5	8.3	9.1	40.0	40.8	1.7	2.5	3.4	4.3	5.1	6.0	46
47	6.6	7.4	8.3	9.1	40.0	0.9	1.7	2.6	3.5	4.4	5.3	6.2	7.1	47
48	7.4	8.3	9.2	40.0	0.9	1.8	2.7	3.6	4.6	5.5	6.4	7.4	8.3	48
49	8.3	9.2	40.1	1.0	1.9	2.8	3.8	4.7	5.7	6.7	7.6	8.6	9.6	49
50	39.2	40.2	41.1	42.0	43.0	43.9	44.9	45.9	46.9	47.9	48.9	50.0	51.1	50
51	40.2	1.2	2.2	3.2	4.1	5.1	6.2	7.2	8.2	9.3	50.4	1.5	2.6	51
52	1.3	2.3	3.3	4.4	5.4	6.4	7.5	8.6	9.7	50.8	2.0	3.1	4.3	52
53	2.5	3.5	4.6	5.7	6.7	7.8	9.0	50.1	51.3	2.5	3.7	4.9	6.2	53
54	3.8	4.9	6.0	7.1	8.2	9.4	50.6	1.8	3.0	4.3	5.6	6.9	8.3	54
55.0	45.2	46.3	47.5	48.6	49.8	51.1	52.3	53.6	54.9	56.3	57.7	59.1	60.7	55.0
5.5	5.9	7.1	8.3	9.5	50.7	2.0	3.3	4.6	6.0	7.4	8.9	60.4	2.0	5.5
6.0	6.7	7.9	9.1	50.4	1.6	2.9	4.3	5.7	7.1	8.6	60.1	1.7	3.4	6.0
6.5	7.5	8.8	50.0	1.3	2.6	3.9	5.4	6.8	8.3	9.9	1.5	3.2	5.0	6.5
7.0	8.3	9.6	0.9	2.2	3.6	5.0	6.5	8.0	9.5	61.2	2.9	4.7	6.6	7.0
57.5	49.2	50.5	51.9	53.2	54.7	56.2	57.7	59.3	60.9	62.6	64.5	66.4	68.5	57.5
8.0	50.1	1.5	2.9	4.3	5.8	7.4	8.9	60.6	2.4	4.2	6.2	8.3	70.7	8.0
8.5	1.1	2.5	4.0	5.5	7.0	8.6	60.3	2.1	3.9	6.0	8.1	70.4	3.1	8.5
9.0	2.2	3.6	5.1	6.7	8.3	60.0	1.8	3.7	5.7	7.9	70.3	3.0	6.2	9.0
9.5	3.3	4.8	6.4	8.0	9.7	1.5	3.4	5.5	7.7	70.1	2.8	5.9	80.1	9.5
60.0	54.4	56.0	57.7	59.4	61.2	63.2	65.2	67.4	69.9	72.6	75.8	80.0	90.0	60.0
0.5	5.7	7.4	9.1	61.0	2.9	5.0	7.2	9.6	72.4	5.8	9.9	90.0		0.5
1.0	7.0	8.8	60.7	2.6	4.7	7.0	9.5	72.3	5.5	9.8	90.0			1.0
1.5	8.5	60.3	2.3	4.4	6.7	9.2	72.0	5.4	9.7	90.0				1.5
2.0	60.0	2.0	4.2	6.5	9.0	71.9	5.2	9.6	90.0					2.0
62.5	61.7	63.9	66.2	68.8	71.7	75.1	9.5	90.0						62.5
3.0	3.6	6.0	8.6	71.5	4.9	9.4	90.0							3.0
3.5	5.7	8.3	71.3	4.8	9.3	90.0								3.5
4.0	8.1	71.1	4.6	9.2	90.0									4.0
4.5	70.9	4.4	9.0	90.0										4.5

TABLE 40.

Correction of the Amplitude as observed on the Apparent Horizon.

Latitude.	Declination.													Latitude.
	0°	5°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
5	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	5
10	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	10
15	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	15
20	.2	.2	.2	.2	.2	.2	.3	.3	.3	.3	.3	.3	.3	20
24	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	24
28	.3	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	28
32	.4	.4	.4	.4	.4	.4	.4	.5	.5	.5	.5	.5	.5	32
36	.5	.5	.5	.5	.5	.5	.5	.5	.6	.6	.6	.6	.6	36
38	.5	.5	.5	.5	.6	.6	.6	.6	.6	.6	.6	.7	.7	38
40	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	40
42	.6	.6	.6	.6	.6	.7	.7	.7	.7	.7	.8	.8	.8	42
44	.6	.6	.7	.7	.7	.7	.7	.7	.8	.8	.8	.9	.9	44
46	.7	.7	.7	.7	.7	.8	.8	.8	.8	.9	.9	.9	1.0	46
48	.7	.8	.8	.8	.8	.8	.8	.9	.9	1.0	1.0	1.0	.1	48
50	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	1.0	1.1	1.1	1.1	1.3	50
52	.8	.9	.9	.9	.9	1.0	1.0	1.0	.1	.2	.2	.3	.5	52
54	.9	.9	1.0	1.0	1.0	.1	.1	.1	.2	.3	.4	.5	.8	54
56	1.0	1.0	.1	.1	.1	.2	.2	.2	.3	.5	.6	.8	2.2	56
58	.1	.1	.2	.2	.2	.3	.3	.4	.5	.7	.9	2.3	3.2	58
60	1.2	1.2	1.3	1.3	1.3	1.4	1.5	1.6	1.7	2.0	2.4	3.4		60
62	.3	.3	.4	.4	.4	.6	.7	.8	2.1	.5	3.5			62
64	.4	.4	.5	.5	.6	.8	.9	2.2	.6	3.7				64
66	.5	.5	.7	.7	.9	2.0	2.3	.8	3.8					66
68	.6	.7	.9	2.0	2.2	.4	.9	4.0						68
70	1.8	1.9	2.1	2.3	2.6	3.1	4.3							70
72	2.0	2.1	.5	.8	3.3	4.6								72
74	.2	.5	3.0	3.5	4.8									74
76	.6	3.0	.8	5.2										76
78	3.1	.6	5.7											78
80	3.8	4.4												80

TABLE 41.

Natural Sines and Cosines.

Prop. parts		0°		1°		2°		3°		4°			Prop. parts
29	M.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine	N. cos.		2
0	0	00000	100000	01745	99985	03490	99939	05234	99863	06976	99756	60	2
0	1	00029	100000	01774	99984	03519	99938	05263	99861	07005	99754	59	2
1	2	00058	100000	01803	99984	03548	99937	05292	99860	07034	99752	58	2
1	3	00087	100000	01832	99983	03577	99936	05321	99858	07063	99750	57	2
2	4	00116	100000	01862	99983	03606	99935	05350	99857	07092	99748	56	2
2	5	00145	100000	01891	99982	03635	99934	05379	99855	07121	99746	55	2
3	6	00175	100000	01920	99982	03664	99933	05408	99854	07150	99744	54	2
3	7	00204	100000	01949	99981	03693	99932	05437	99852	07179	99742	53	2
4	8	00233	100000	01978	99980	03723	99931	05466	99851	07208	99740	52	2
4	9	00262	100000	02007	99980	03752	99930	05495	99849	07237	99738	51	2
5	10	00291	100000	02036	99979	03781	99929	05524	99847	07266	99736	50	2
5	11	00320	99999	02065	99979	03810	99927	05553	99846	07295	99734	49	2
6	12	00349	99999	02094	99978	03839	99926	05582	99844	07324	99731	48	2
6	13	00378	99999	02123	99977	03868	99925	05611	99842	07353	99729	47	2
7	14	00407	99999	02152	99977	03897	99924	05640	99841	07382	99727	46	2
7	15	00436	99999	02181	99976	03926	99923	05669	99839	07411	99725	45	2
8	16	00465	99999	02211	99976	03955	99922	05698	99838	07440	99723	44	1
8	17	00495	99999	02240	99975	03984	99921	05727	99836	07469	99721	43	1
9	18	00524	99999	02269	99974	04013	99919	05756	99834	07498	99719	42	1
9	19	00553	99998	02298	99974	04042	99918	05785	99833	07527	99716	41	1
10	20	00582	99998	02327	99973	04071	99917	05814	99831	07556	99714	40	1
10	21	00611	99998	02356	99972	04100	99916	05844	99829	07585	99712	39	1
11	22	00640	99998	02385	99972	04129	99915	05873	99827	07614	99710	38	1
11	23	00669	99998	02414	99971	04159	99913	05902	99826	07643	99708	37	1
12	24	00698	99998	02443	99970	04188	99912	05931	99824	07672	99705	36	1
12	25	00727	99997	02472	99969	04217	99911	05960	99822	07701	99703	35	1
13	26	00756	99997	02501	99969	04246	99910	05989	99821	07730	99701	34	1
13	27	00785	99997	02530	99968	04275	99909	06018	99819	07759	99699	33	1
14	28	00814	99997	02560	99967	04304	99907	06047	99817	07788	99696	32	1
14	29	00844	99996	02589	99966	04333	99906	06076	99815	07817	99694	31	1
15	30	00873	99996	02618	99966	04362	99905	06105	99813	07846	99692	30	1
15	31	00902	99996	02647	99965	04391	99904	06134	99812	07875	99689	29	1
15	32	00931	99996	02676	99964	04420	99902	06163	99810	07904	99687	28	1
16	33	00960	99995	02705	99963	04449	99901	06192	99808	07933	99685	27	1
16	34	00989	99995	02734	99963	04478	99900	06221	99806	07962	99683	26	1
17	35	01018	99995	02763	99962	04507	99898	06250	99804	07991	99680	25	1
17	36	01047	99995	02792	99961	04536	99897	06279	99803	08020	99678	24	1
18	37	01076	99994	02821	99960	04565	99896	06308	99801	08049	99676	23	1
18	38	01105	99994	02850	99959	04594	99894	06337	99799	08078	99673	22	1
19	39	01134	99994	02879	99959	04623	99893	06366	99797	08107	99671	21	1
19	40	01164	99993	02908	99958	04653	99892	06395	99795	08136	99668	20	1
20	41	01193	99993	02938	99957	04682	99890	06424	99793	08165	99666	19	1
20	42	01222	99993	02967	99956	04711	99889	06453	99792	08194	99664	18	1
21	43	01251	99992	02996	99955	04740	99888	06482	99790	08223	99661	17	1
21	44	01280	99992	03025	99954	04769	99886	06511	99788	08252	99659	16	1
22	45	01309	99991	03054	99953	04798	99885	06540	99786	08281	99657	15	1
22	46	01338	99991	03083	99952	04827	99883	06569	99784	08310	99654	14	0
23	47	01367	99991	03112	99952	04856	99882	06598	99782	08339	99652	13	0
23	48	01396	99990	03141	99951	04885	99881	06627	99780	08368	99649	12	0
24	49	01425	99990	03170	99950	04914	99879	06656	99778	08397	99647	11	0
24	50	01454	99989	03199	99949	04943	99878	06685	99776	08426	99644	10	0
25	51	01483	99989	03228	99948	04972	99876	06714	99774	08455	99642	9	0
25	52	01513	99989	03257	99947	05001	99875	06743	99772	08484	99639	8	0
26	53	01542	99988	03286	99946	05030	99873	06773	99770	08513	99637	7	0
26	54	01571	99988	03316	99945	05059	99872	06802	99768	08542	99635	6	0
27	55	01600	99987	03345	99944	05088	99870	06831	99766	08571	99632	5	0
27	56	01629	99987	03374	99943	05117	99869	06860	99764	08600	99630	4	0
28	57	01658	99986	03403	99942	05146	99867	06889	99762	08629	99627	3	0
28	58	01687	99986	03432	99941	05175	99866	06918	99760	08658	99625	2	0
29	59	01716	99985	03461	99940	05205	99864	06947	99758	08687	99622	1	0
29	60	01745	99985	03490	99939	05234	99863	06976	99756	08716	99619	0	0
		N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	M.	
		89°		88°		87°		86°		85°			

TABLE 41.

Natural Sines and Cosines.

Prop. parts		5°		6°		7°		8°		9°			Prop. parts
29	M.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.		4.
0	0	08716	99619	10453	99452	12187	99255	13917	99027	15643	98769	60	4
0	1	08745	99617	10482	99449	12216	99251	13946	99023	15672	98764	59	4
1	2	08774	99614	10511	99446	12245	99248	13975	99019	15701	98760	58	4
1	3	08803	99612	10540	99443	12274	99244	14004	99015	15730	98755	57	4
2	4	08831	99609	10569	99440	12302	99240	14033	99011	15758	98751	56	4
2	5	08860	99607	10597	99437	12331	99237	14061	99006	15787	98746	55	4
3	6	08889	99604	10626	99434	12360	99233	14090	99002	15816	98741	54	4
3	7	08918	99602	10655	99431	12389	99230	14119	98998	15845	98737	53	4
4	8	08947	99599	10684	99428	12418	99226	14148	98994	15873	98732	52	3
4	9	08976	99596	10713	99424	12447	99222	14177	98990	15902	98728	51	3
5	10	09005	99594	10742	99421	12476	99219	14205	98986	15931	98723	50	3
5	11	09034	99591	10771	99418	12504	99215	14234	98982	15959	98718	49	3
6	12	09063	99588	10800	99415	12533	99211	14263	98978	15988	98714	48	3
6	13	09092	99586	10829	99412	12562	99208	14292	98973	16017	98709	47	3
7	14	09121	99583	10858	99409	12591	99204	14320	98969	16046	98704	46	3
7	15	09150	99580	10887	99406	12620	99200	14349	98965	16074	98700	45	3
8	16	09179	99578	10916	99402	12649	99197	14378	98961	16103	98695	44	3
8	17	09208	99575	10945	99399	12678	99193	14407	98957	16132	98690	43	3
9	18	09237	99572	10973	99396	12706	99189	14436	98953	16160	98686	42	3
9	19	09266	99570	11002	99393	12735	99186	14464	98948	16189	98681	41	3
10	20	09295	99567	11031	99390	12764	99182	14493	98944	16218	98676	40	3
10	21	09324	99564	11060	99386	12793	99178	14522	98940	16246	98671	39	3
11	22	09353	99562	11089	99383	12822	99175	14551	98936	16275	98667	38	3
11	23	09382	99559	11118	99380	12851	99171	14580	98931	16304	98662	37	2
12	24	09411	99556	11147	99377	12880	99167	14608	98927	16333	98657	36	2
12	25	09440	99553	11176	99374	12908	99163	14637	98923	16361	98652	35	2
13	26	09469	99551	11205	99370	12937	99160	14666	98919	16390	98648	34	2
13	27	09498	99548	11234	99367	12966	99156	14695	98914	16419	98643	33	2
14	28	09527	99545	11263	99364	12995	99152	14723	98910	16447	98638	32	2
14	29	09556	99542	11291	99360	13024	99148	14752	98906	16476	98633	31	2
15	30	09585	99540	11320	99357	13053	99144	14781	98902	16505	98629	30	2
15	31	09614	99537	11349	99354	13081	99141	14810	98897	16533	98624	29	2
15	32	09642	99534	11378	99351	13110	99137	14838	98893	16562	98619	28	2
16	33	09671	99531	11407	99347	13139	99133	14867	98889	16591	98614	27	2
16	34	09700	99528	11436	99344	13168	99129	14896	98884	16620	98609	26	2
17	35	09729	99526	11465	99341	13197	99125	14925	98880	16648	98604	25	2
17	36	09758	99523	11494	99337	13226	99122	14954	98876	16677	98600	24	2
18	37	09787	99520	11523	99334	13254	99118	14982	98871	16706	98595	23	2
18	38	09816	99517	11552	99331	13283	99114	15011	98867	16734	98590	22	1
19	39	09845	99514	11580	99327	13312	99110	15040	98863	16763	98585	21	1
19	40	09874	99511	11609	99324	13341	99106	15069	98858	16792	98580	20	1
20	41	09903	99508	11638	99320	13370	99102	15097	98854	16820	98575	19	1
20	42	09932	99506	11667	99317	13399	99098	15126	98849	16849	98570	18	1
21	43	09961	99503	11696	99314	13427	99094	15155	98845	16878	98565	17	1
21	44	09990	99500	11725	99310	13456	99091	15184	98841	16906	98561	16	1
22	45	10019	99497	11754	99307	13485	99087	15212	98836	16935	98556	15	1
22	46	10048	99494	11783	99303	13514	99083	15241	98832	16964	98551	14	1
23	47	10077	99491	11812	99300	13543	99079	15270	98827	16992	98546	13	1
23	48	10106	99488	11840	99297	13572	99075	15299	98823	17021	98541	12	1
24	49	10135	99485	11869	99293	13600	99071	15327	98818	17050	98536	11	1
24	50	10164	99482	11898	99290	13629	99067	15356	98814	17078	98531	10	1
25	51	10192	99479	11927	99286	13658	99063	15385	98809	17107	98526	9	1
25	52	10221	99476	11956	99283	13687	99059	15414	98805	17136	98521	8	1
26	53	10250	99473	11985	99279	13716	99055	15442	98800	17164	98516	7	0
26	54	10279	99470	12014	99276	13744	99051	15471	98796	17193	98511	6	0
27	55	10308	99467	12043	99272	13773	99047	15500	98791	17222	98506	5	0
27	56	10337	99464	12071	99269	13802	99043	15529	98787	17250	98501	4	0
28	57	10366	99461	12100	99265	13831	99039	15557	98782	17279	98496	3	0
28	58	10395	99458	12129	99262	13860	99035	15586	98778	17308	98491	2	0
29	59	10424	99455	12158	99258	13889	99031	15615	98773	17336	98486	1	0
29	60	10453	99452	12187	99255	13917	99027	15643	98769	17365	98481	0	0
		N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	M.	
		84°		83°		82°		81°		80°			

TABLE 41.

Natural Sines and Cosines.

Prop. parts 28		10°		11°		12°		13°		14°			Prop. parts 6
	M.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.		
0	0	17365	98481	19081	98163	20791	97815	22495	97437	24192	97030	60	6
0	1	17393	98476	19109	98157	20820	97809	22523	97430	24220	97023	59	6
1	2	17422	98471	19138	98152	20848	97803	22552	97424	24249	97015	58	6
1	3	17451	98466	19167	98146	20877	97797	22580	97417	24277	97008	57	6
2	4	17479	98461	19195	98140	20905	97791	22608	97411	24305	97001	56	6
2	5	17508	98455	19224	98135	20933	97784	22637	97404	24333	96994	55	6
3	6	17537	98450	19252	98129	20962	97778	22665	97398	24362	96987	54	5
3	7	17565	98445	19281	98124	20990	97772	22693	97391	24390	96980	53	5
4	8	17594	98440	19309	98118	21019	97766	22722	97384	24418	96973	52	5
4	9	17623	98435	19338	98112	21047	97760	22750	97378	24446	96966	51	5
5	10	17651	98430	19366	98107	21076	97754	22778	97371	24474	96959	50	5
5	11	17680	98425	19395	98101	21104	97748	22807	97365	24503	96952	49	5
6	12	17708	98420	19423	98096	21132	97742	22835	97358	24531	96945	48	5
6	13	17737	98414	19452	98090	21161	97735	22863	97351	24559	96937	47	5
7	14	17766	98409	19481	98084	21189	97729	22892	97345	24587	96930	46	5
7	15	17794	98404	19509	98079	21218	97723	22920	97338	24615	96923	45	5
7	16	17823	98399	19538	98073	21246	97717	22948	97331	24644	96916	44	4
8	17	17852	98394	19566	98067	21275	97711	22977	97325	24672	96909	43	4
8	18	17880	98389	19595	98061	21303	97705	23005	97318	24700	96902	42	4
9	19	17909	98383	19623	98056	21331	97698	23033	97311	24728	96894	41	4
9	20	17937	98378	19652	98050	21360	97692	23062	97304	24756	96887	40	4
10	21	17966	98373	19680	98044	21388	97686	23090	97298	24784	96880	39	4
10	22	17995	98368	19709	98039	21417	97680	23118	97291	24813	96873	38	4
11	23	18023	98362	19737	98033	21445	97673	23146	97284	24841	96866	37	4
11	24	18052	98357	19766	98027	21474	97667	23175	97278	24869	96858	36	4
12	25	18081	98352	19794	98021	21502	97661	23203	97271	24897	96851	35	4
12	26	18109	98347	19823	98016	21530	97655	23231	97264	24925	96844	34	3
13	27	18138	98341	19851	98010	21559	97648	23260	97257	24954	96837	33	3
13	28	18166	98336	19880	98004	21587	97642	23288	97251	24982	96829	32	3
14	29	18195	98331	19908	97998	21616	97636	23316	97244	25010	96822	31	3
14	30	18224	98325	19937	97992	21644	97630	23345	97237	25038	96815	30	3
14	31	18252	98320	19965	97987	21672	97623	23373	97230	25066	96807	29	3
15	32	18281	98315	19994	97981	21701	97617	23401	97223	25094	96800	28	3
15	33	18309	98310	20022	97975	21729	97611	23429	97217	25122	96793	27	3
16	34	18338	98304	20051	97969	21758	97604	23458	97210	25151	96786	26	3
16	35	18367	98299	20079	97963	21786	97598	23486	97203	25179	96778	25	3
17	36	18395	98294	20108	97958	21814	97592	23514	97196	25207	96771	24	2
17	37	18424	98288	20136	97952	21843	97585	23542	97189	25235	96764	23	2
18	38	18452	98283	20165	97946	21871	97579	23571	97182	25263	96756	22	2
18	39	18481	98277	20193	97940	21899	97573	23599	97176	25291	96749	21	2
19	40	18509	98272	20222	97934	21928	97566	23627	97169	25320	96742	20	2
19	41	18538	98267	20250	97928	21956	97560	23656	97162	25348	96734	19	2
20	42	18567	98261	20279	97922	21985	97553	23684	97155	25376	96727	18	2
20	43	18595	98256	20307	97916	22013	97547	23712	97148	25404	96719	17	2
21	44	18624	98250	20336	97910	22041	97541	23740	97141	25432	96712	16	2
21	45	18652	98245	20364	97905	22070	97534	23769	97134	25460	96705	15	2
21	46	18681	98240	20393	97899	22098	97528	23797	97127	25488	96697	14	1
22	47	18710	98234	20421	97893	22126	97521	23825	97120	25516	96690	13	1
22	48	18738	98229	20450	97887	22155	97515	23853	97113	25545	96682	12	1
23	49	18767	98223	20478	97881	22183	97508	23882	97106	25573	96675	11	1
23	50	18795	98218	20507	97875	22212	97502	23910	97100	25601	96667	10	1
24	51	18824	98212	20535	97869	22240	97496	23938	97093	25629	96660	9	1
24	52	18852	98207	20563	97863	22268	97489	23966	97086	25657	96653	8	1
25	53	18881	98201	20592	97857	22297	97483	23995	97079	25685	96645	7	1
25	54	18910	98196	20620	97851	22325	97476	24023	97072	25713	96638	6	1
26	55	18938	98190	20649	97845	22353	97470	24051	97065	25741	96630	5	1
26	56	18967	98185	20677	97839	22382	97463	24079	97058	25769	96623	4	0
27	57	18995	98179	20706	97833	22410	97457	24108	97051	25798	96615	3	0
27	58	19024	98174	20734	97827	22438	97450	24136	97044	25826	96608	2	0
28	59	19052	98168	20763	97821	22467	97444	24164	97037	25854	96600	1	0
28	60	19081	98163	20791	97815	22495	97437	24192	97030	25882	96593	0	0
		N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	M.	
		79°		78°		77°		76°		75°			

TABLE 41.

Natural Sines and Cosines.

Prop. parts 27		15°		16°		17°		18°		19°			Prop. parts 9
	M.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.		
0	0	25882	96593	27564	96126	29237	95630	30902	95106	32557	94552	60	9
0	1	25910	96585	27592	96118	29265	95622	30929	95097	32584	94542	59	9
1	2	25938	96578	27620	96110	29293	95613	30957	95088	32612	94533	58	9
1	3	25966	96570	27648	96102	29321	95605	30985	95079	32639	94523	57	9
2	4	25994	96562	27676	96094	29348	95596	31012	95070	32667	94514	56	8
2	5	26022	96555	27704	96086	29376	95588	31040	95061	32694	94504	55	8
3	6	26050	96547	27731	96078	29404	95579	31068	95052	32722	94495	54	8
3	7	26079	96540	27759	96070	29432	95571	31095	95043	32749	94485	53	8
4	8	26107	96532	27787	96062	29460	95562	31123	95033	32777	94476	52	8
4	9	26135	96524	27815	96054	29487	95554	31151	95024	32804	94466	51	8
5	10	26163	96517	27843	96046	29515	95545	31178	95015	32832	94457	50	8
5	11	26191	96509	27871	96037	29543	95536	31206	95006	32859	94447	49	7
5	12	26219	96502	27899	96029	29571	95528	31233	94997	32887	94438	48	7
6	13	26247	96494	27927	96021	29599	95519	31261	94988	32914	94428	47	7
6	14	26275	96486	27955	96013	29626	95511	31289	94979	32942	94418	46	7
7	15	26303	96479	27983	96005	29654	95502	31316	94970	32969	94409	45	7
7	16	26331	96471	28011	95997	29682	95493	31344	94961	32997	94399	44	7
8	17	26359	96463	28039	95989	29710	95485	31372	94952	33024	94390	43	6
8	18	26387	96456	28067	95981	29737	95476	31399	94943	33051	94380	42	6
9	19	26415	96448	28095	95972	29765	95467	31427	94933	33079	94370	41	6
9	20	26443	96440	28123	95964	29793	95459	31454	94924	33106	94361	40	6
9	21	26471	96433	28150	95956	29821	95450	31482	94915	33134	94351	39	6
10	22	26500	96425	28178	95948	29849	95441	31510	94906	33161	94342	38	6
10	23	26528	96417	28206	95940	29876	95433	31537	94897	33189	94332	37	6
11	24	26556	96410	28234	95931	29904	95424	31565	94888	33216	94322	36	5
11	25	26584	96402	28262	95923	29932	95415	31593	94878	33244	94313	35	5
12	26	26612	96394	28290	95915	29960	95407	31620	94869	33271	94303	34	5
12	27	26640	96386	28318	95907	29987	95398	31648	94860	33298	94293	33	5
13	28	26668	96379	28346	95898	30015	95389	31675	94851	33326	94284	32	5
13	29	26696	96371	28374	95890	30043	95380	31703	94842	33353	94274	31	5
14	30	26724	96363	28402	95882	30071	95372	31730	94832	33381	94264	30	5
14	31	26752	96355	28429	95874	30098	95363	31758	94823	33408	94254	29	4
14	32	26780	96347	28457	95865	30126	95354	31786	94814	33436	94245	28	4
15	33	26808	96340	28485	95857	30154	95345	31813	94805	33463	94235	27	4
15	34	26836	96332	28513	95849	30182	95337	31841	94795	33490	94225	26	4
16	35	26864	96324	28541	95841	30209	95328	31868	94786	33518	94215	25	4
16	36	26892	96316	28569	95832	30237	95319	31896	94777	33545	94206	24	4
17	37	26920	96308	28597	95824	30265	95310	31923	94768	33573	94196	23	3
17	38	26948	96301	28625	95816	30292	95301	31951	94758	33600	94186	22	3
18	39	26976	96293	28652	95807	30320	95293	31979	94749	33627	94176	21	3
18	40	27004	96285	28680	95799	30348	95284	32006	94740	33655	94167	20	3
18	41	27032	96277	28708	95791	30376	95275	32034	94730	33682	94157	19	3
19	42	27060	96269	28736	95782	30403	95266	32061	94721	33710	94147	18	3
19	43	27088	96261	28764	95774	30431	95257	32089	94712	33737	94137	17	3
20	44	27116	96253	28792	95766	30459	95248	32116	94702	33764	94127	16	2
20	45	27144	96246	28820	95757	30486	95240	32144	94693	33792	94118	15	2
21	46	27172	96238	28847	95749	30514	95231	32171	94684	33819	94108	14	2
21	47	27200	96230	28875	95740	30542	95222	32199	94674	33846	94098	13	2
22	48	27228	96222	28903	95732	30570	95213	32227	94665	33874	94088	12	2
22	49	27256	96214	28931	95724	30597	95204	32254	94656	33901	94078	11	2
23	50	27284	96206	28959	95715	30625	95195	32282	94646	33929	94068	10	2
23	51	27312	96198	28987	95707	30653	95186	32309	94637	33956	94058	9	1
23	52	27340	96190	29015	95698	30680	95177	32337	94627	33983	94049	8	1
24	53	27368	96182	29042	95690	30708	95168	32364	94618	34011	94039	7	1
24	54	27396	96174	29070	95681	30736	95159	32392	94609	34038	94029	6	1
25	55	27424	96166	29098	95673	30763	95150	32419	94599	34065	94019	5	1
25	56	27452	96158	29126	95664	30791	95142	32447	94590	34093	94009	4	1
26	57	27480	96150	29154	95656	30819	95133	32474	94580	34120	93999	3	0
26	58	27508	96142	29182	95647	30846	95124	32502	94571	34147	93989	2	0
27	59	27536	96134	29209	95639	30874	95115	32529	94561	34175	93979	1	0
27	60	27564	96126	29237	95630	30902	95106	32557	94552	34202	93969	0	0
		N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	M.	
		74°		73°		72°		71°		70°			

TABLE 41.

Natural Sines and Cosines.

Prop. parts 27	M.	20°		21°		22°		23°		24°			Prop. parts 11
		N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.		
0	0	34202	93969	35837	93358	37461	92718	39073	92050	40674	91355	60	11
0	1	34229	93959	35864	93348	37488	92707	39100	92039	40700	91343	59	11
1	2	34257	93949	35891	93337	37515	92697	39127	92028	40727	91331	58	11
1	3	34284	93939	35918	93327	37542	92686	39153	92016	40753	91319	57	10
2	4	34311	93929	35945	93316	37569	92675	39180	92005	40780	91307	56	10
2	5	34339	93919	35973	93306	37595	92664	39207	91994	40806	91295	55	10
3	6	34366	93909	36000	93295	37622	92653	39234	91982	40833	91283	54	10
3	7	34393	93899	36027	93285	37649	92642	39260	91971	40860	91272	53	10
4	8	34421	93889	36054	93274	37676	92631	39287	91959	40886	91260	52	10
4	9	34448	93879	36081	93264	37703	92620	39314	91948	40913	91248	51	9
5	10	34475	93869	36108	93253	37730	92609	39341	91936	40939	91236	50	9
5	11	34503	93859	36135	93243	37757	92598	39367	91925	40966	91224	49	9
5	12	34530	93849	36162	93232	37784	92587	39394	91914	40992	91212	48	9
6	13	34557	93839	36190	93222	37811	92576	39421	91902	41019	91200	47	9
6	14	34584	93829	36217	93211	37838	92565	39448	91891	41045	91188	46	8
7	15	34612	93819	36244	93201	37865	92554	39474	91879	41072	91176	45	8
7	16	34639	93809	36271	93190	37892	92543	39501	91868	41098	91164	44	8
8	17	34666	93799	36298	93180	37919	92532	39528	91856	41125	91152	43	8
8	18	34694	93789	36325	93169	37946	92521	39555	91845	41151	91140	42	8
9	19	34721	93779	36352	93159	37973	92510	39581	91833	41178	91128	41	8
9	20	34748	93769	36379	93148	37999	92499	39608	91822	41204	91116	40	7
9	21	34775	93759	36406	93137	38026	92488	39635	91810	41231	91104	39	7
10	22	34803	93748	36434	93127	38053	92477	39661	91799	41257	91092	38	7
10	23	34830	93738	36461	93116	38080	92466	39688	91787	41284	91080	37	7
11	24	34857	93728	36488	93106	38107	92455	39715	91775	41310	91068	36	7
11	25	34884	93718	36515	93095	38134	92444	39741	91764	41337	91056	35	6
12	26	34912	93708	36542	93084	38161	92432	39768	91752	41363	91044	34	6
12	27	34939	93698	36569	93074	38188	92421	39795	91741	41390	91032	33	6
13	28	34966	93688	36596	93063	38215	92410	39822	91729	41416	91020	32	6
13	29	34993	93677	36623	93052	38241	92399	39848	91718	41443	91008	31	6
14	30	35021	93667	36650	93042	38268	92388	39875	91706	41469	90996	30	6
14	31	35048	93657	36677	93031	38295	92377	39902	91694	41496	90984	29	5
14	32	35075	93647	36704	93020	38322	92366	39928	91683	41522	90972	28	5
15	33	35102	93637	36731	93010	38349	92355	39955	91671	41549	90960	27	5
15	34	35130	93626	36758	92999	38376	92343	39982	91660	41575	90948	26	5
16	35	35157	93616	36785	92988	38403	92332	40008	91648	41602	90936	25	5
16	36	35184	93606	36812	92978	38430	92321	40035	91636	41628	90924	24	4
17	37	35211	93596	36839	92967	38456	92310	40062	91625	41655	90911	23	4
17	38	35239	93585	36867	92956	38483	92299	40088	91613	41681	90899	22	4
18	39	35266	93575	36894	92945	38510	92287	40115	91601	41707	90887	21	4
18	40	35293	93565	36921	92935	38537	92276	40141	91590	41734	90875	20	4
18	41	35320	93555	36948	92924	38564	92265	40168	91578	41760	90863	19	3
19	42	35347	93544	36975	92913	38591	92254	40195	91566	41787	90851	18	3
19	43	35375	93534	37002	92902	38617	92243	40221	91555	41813	90839	17	3
20	44	35402	93524	37029	92892	38644	92231	40248	91543	41840	90826	16	3
20	45	35429	93514	37056	92881	38671	92220	40275	91531	41866	90814	15	3
21	46	35456	93503	37083	92870	38698	92209	40301	91519	41892	90802	14	3
21	47	35484	93493	37110	92859	38725	92198	40328	91508	41919	90790	13	2
22	48	35511	93483	37137	92849	38752	92186	40355	91496	41945	90778	12	2
22	49	35538	93472	37164	92838	38778	92175	40381	91484	41972	90766	11	2
23	50	35565	93462	37191	92827	38805	92164	40408	91472	41998	90753	10	2
23	51	35592	93452	37218	92816	38832	92152	40434	91461	42024	90741	9	2
23	52	35619	93441	37245	92805	38859	92141	40461	91449	42051	90729	8	1
24	53	35647	93431	37272	92794	38886	92130	40488	91437	42077	90717	7	1
24	54	35674	93420	37299	92784	38912	92119	40514	91425	42104	90704	6	1
25	55	35701	93410	37326	92773	38939	92107	40541	91414	42130	90692	5	1
25	56	35728	93400	37353	92762	38966	92096	40567	91402	42156	90680	4	1
26	57	35755	93389	37380	92751	38993	92085	40594	91390	42183	90668	3	1
26	58	35782	93379	37407	92740	39020	92073	40621	91378	42209	90655	2	0
27	59	35810	93368	37434	92729	39046	92062	40647	91366	42235	90643	1	0
27	60	35837	93358	37461	92718	39073	92050	40674	91355	42262	90631	0	0
		N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	M.	
		69°		68°		67°		66°		65°			

TABLE 41.

Natural Sines and Cosines.

Prop. parts 26		25°		26°		27°		28°		29°			Prop. parts 14
	M.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.		
0	0	42262	90631	43837	89879	45399	89101	46947	88295	48481	87462	60	14
0	1	42288	90618	43863	89867	45425	89087	46973	88281	48506	87448	59	14
1	2	42315	90606	43889	89854	45451	89074	46999	88267	48532	87434	58	14
1	3	42341	90594	43916	89841	45477	89061	47024	88254	48557	87420	57	13
2	4	42367	90582	43942	89828	45503	89048	47050	88240	48583	87406	56	13
2	5	42394	90569	43968	89816	45529	89035	47076	88226	48608	87391	55	13
3	6	42420	90557	43994	89803	45554	89021	47101	88213	48634	87377	54	13
3	7	42446	90545	44020	89790	45580	89008	47127	88199	48659	87363	53	12
3	8	42473	90532	44046	89777	45606	88995	47153	88185	48684	87349	52	12
4	9	42499	90520	44072	89764	45632	88981	47178	88172	48710	87335	51	12
4	10	42525	90507	44098	89752	45658	88968	47204	88158	48735	87321	50	12
5	11	42552	90495	44124	89739	45684	88955	47229	88144	48761	87306	49	11
5	12	42578	90483	44151	89726	45710	88942	47255	88130	48786	87292	48	11
6	13	42604	90470	44177	89713	45736	88928	47281	88117	48811	87278	47	11
6	14	42631	90458	44203	89700	45762	88915	47306	88103	48837	87264	46	11
7	15	42657	90446	44229	89687	45787	88902	47332	88089	48862	87250	45	11
7	16	42683	90433	44255	89674	45813	88888	47358	88075	48888	87235	44	10
7	17	42709	90421	44281	89662	45839	88875	47383	88062	48913	87221	43	10
8	18	42736	90408	44307	89649	45865	88862	47409	88048	48938	87207	42	10
8	19	42762	90396	44333	89636	45891	88848	47434	88034	48964	87193	41	10
9	20	42788	90383	44359	89623	45917	88835	47460	88020	48989	87178	40	9
9	21	42815	90371	44385	89610	45942	88822	47486	88006	49014	87164	39	9
10	22	42841	90358	44411	89597	45968	88808	47511	87993	49040	87150	38	9
10	23	42867	90346	44437	89584	45994	88795	47537	87979	49065	87136	37	9
10	24	42894	90334	44464	89571	46020	88782	47562	87965	49090	87121	36	8
11	25	42920	90321	44490	89558	46046	88768	47588	87951	49116	87107	35	8
11	26	42946	90309	44516	89545	46072	88755	47614	87937	49141	87093	34	8
12	27	42972	90296	44542	89532	46097	88741	47639	87923	49166	87079	33	8
12	28	42999	90284	44568	89519	46123	88728	47665	87909	49192	87064	32	7
13	29	43025	90271	44594	89506	46149	88715	47690	87896	49217	87050	31	7
13	30	43051	90259	44620	89493	46175	88701	47716	87882	49242	87036	30	7
13	31	43077	90246	44646	89480	46201	88688	47741	87868	49268	87021	29	7
14	32	43104	90233	44672	89467	46226	88674	47767	87854	49293	87007	28	7
14	33	43130	90221	44698	89454	46252	88661	47793	87840	49318	86993	27	6
15	34	43156	90208	44724	89441	46278	88647	47818	87826	49344	86978	26	6
15	35	43182	90196	44750	89428	46304	88634	47844	87812	49369	86964	25	6
16	36	43209	90183	44776	89415	46330	88620	47869	87798	49394	86949	24	6
16	37	43235	90171	44802	89402	46355	88607	47895	87784	49419	86935	23	5
16	38	43261	90158	44828	89389	46381	88593	47920	87770	49445	86921	22	5
17	39	43287	90146	44854	89376	46407	88580	47946	87756	49470	86906	21	5
17	40	43313	90133	44880	89363	46433	88566	47971	87743	49495	86892	20	5
18	41	43340	90120	44906	89350	46458	88553	47997	87729	49521	86878	19	4
18	42	43366	90108	44932	89337	46484	88539	48022	87715	49546	86863	18	4
19	43	43392	90095	44958	89324	46510	88526	48048	87701	49571	86849	17	4
19	44	43418	90082	44984	89311	46536	88512	48073	87687	49596	86834	16	4
20	45	43445	90070	45010	89298	46561	88499	48099	87673	49622	86820	15	4
20	46	43471	90057	45036	89285	46587	88485	48124	87659	49647	86805	14	3
20	47	43497	90045	45062	89272	46613	88472	48150	87645	49672	86791	13	3
21	48	43523	90032	45088	89259	46639	88458	48175	87631	49697	86777	12	3
21	49	43549	90019	45114	89245	46664	88445	48201	87617	49723	86762	11	3
22	50	43575	90007	45140	89232	46690	88431	48226	87603	49748	86748	10	2
22	51	43602	89994	45166	89219	46716	88417	48252	87589	49773	86733	9	2
23	52	43628	89981	45192	89206	46742	88404	48277	87575	49798	86719	8	2
23	53	43654	89968	45218	89193	46767	88390	48303	87561	49824	86704	7	2
23	54	43680	89956	45243	89180	46793	88377	48328	87546	49849	86690	6	1
24	55	43706	89943	45269	89167	46819	88363	48354	87532	49874	86675	5	1
24	56	43733	89930	45295	89153	46844	88349	48379	87518	49899	86661	4	1
25	57	43759	89918	45321	89140	46870	88336	48405	87504	49924	86646	3	1
25	58	43785	89905	45347	89127	46896	88322	48430	87490	49950	86632	2	0
26	59	43811	89892	45373	89114	46921	88308	48456	87476	49975	86617	1	0
26	60	43837	89879	45399	89101	46947	88295	48481	87462	50000	86603	0	0
		N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	M.	
		64°		63°		62°		61°		60°			

TABLE 41.

Natural Sines and Cosines.

Prop. parts. 25	M.	30°		31°		32°		33°		34°			Prop. parts. 16
	M.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.		
0	0	50000	86603	51504	85717	52992	84805	54464	83867	55919	82904	60	16
0	1	50025	86588	51529	85702	53017	84789	54488	83851	55943	82887	59	16
1	2	50050	86573	51554	85687	53041	84774	54513	83835	55968	82871	58	15
1	3	50076	86559	51579	85672	53066	84759	54537	83819	55992	82855	57	15
2	4	50101	86544	51604	85657	53091	84743	54561	83804	56016	82839	56	15
2	5	50126	86530	51628	85642	53115	84728	54586	83788	56040	82822	55	15
3	6	50151	86515	51653	85627	53140	84712	54610	83772	56064	82806	54	14
3	7	50176	86501	51678	85612	53164	84697	54635	83756	56088	82790	53	14
3	8	50201	86486	51703	85597	53189	84681	54659	83740	56112	82773	52	14
4	9	50227	86471	51728	85582	53214	84666	54683	83724	56136	82757	51	14
4	10	50252	86457	51753	85567	53238	84650	54708	83708	56160	82741	50	13
5	11	50277	86442	51778	85551	53263	84635	54732	83692	56184	82724	49	13
5	12	50302	86427	51803	85536	53288	84619	54756	83676	56208	82708	48	13
5	13	50327	86413	51828	85521	53312	84604	54781	83660	56232	82692	47	13
6	14	50352	86398	51852	85506	53337	84588	54805	83645	56256	82675	46	12
6	15	50377	86384	51877	85491	53361	84573	54829	83629	56280	82659	45	12
7	16	50403	86369	51902	85476	53386	84557	54854	83613	56305	82643	44	12
7	17	50428	86354	51927	85461	53411	84542	54878	83597	56329	82626	43	11
8	18	50453	86340	51952	85446	53435	84526	54902	83581	56353	82610	42	11
8	19	50478	86325	51977	85431	53460	84511	54927	83565	56377	82593	41	11
8	20	50503	86310	52002	85416	53484	84495	54951	83549	56401	82577	40	11
9	21	50528	86295	52026	85401	53509	84480	54975	83533	56425	82561	39	10
9	22	50553	86281	52051	85385	53534	84464	54999	83517	56449	82544	38	10
10	23	50578	86266	52076	85370	53558	84448	55024	83501	56473	82528	37	10
10	24	50603	86251	52101	85355	53583	84433	55048	83485	56497	82511	36	10
10	25	50628	86237	52126	85340	53607	84417	55072	83469	56521	82495	35	9
11	26	50654	86222	52151	85325	53632	84402	55097	83453	56545	82478	34	9
11	27	50679	86207	52175	85310	53656	84386	55121	83437	56569	82462	33	9
12	28	50704	86192	52200	85294	53681	84370	55145	83421	56593	82446	32	9
12	29	50729	86178	52225	85279	53705	84355	55169	83405	56617	82429	31	8
13	30	50754	86163	52250	85264	53730	84339	55194	83389	56641	82413	30	8
13	31	50779	86148	52275	85249	53754	84324	55218	83373	56665	82396	29	8
13	32	50804	86133	52299	85234	53779	84308	55242	83356	56689	82380	28	7
14	33	50829	86119	52324	85218	53804	84292	55266	83340	56713	82363	27	7
14	34	50854	86104	52349	85203	53828	84277	55291	83324	56736	82347	26	7
15	35	50879	86089	52374	85188	53853	84261	55315	83308	56760	82330	25	7
15	36	50904	86074	52399	85173	53877	84245	55339	83292	56784	82314	24	6
15	37	50929	86059	52423	85157	53902	84230	55363	83276	56808	82297	23	6
16	38	50954	86045	52448	85142	53926	84214	55388	83260	56832	82281	22	6
16	39	50979	86030	52473	85127	53951	84198	55412	83244	56856	82264	21	6
17	40	51004	86015	52498	85112	53975	84182	55436	83228	56880	82248	20	5
17	41	51029	86000	52522	85096	54000	84167	55460	83212	56904	82231	19	5
18	42	51054	85985	52547	85081	54024	84151	55484	83195	56928	82214	18	5
18	43	51079	85970	52572	85066	54049	84135	55509	83179	56952	82198	17	5
18	44	51104	85956	52597	85051	54073	84120	55533	83163	56976	82181	16	4
19	45	51129	85941	52621	85035	54097	84104	55557	83147	57000	82165	15	4
19	46	51154	85926	52646	85020	54122	84088	55581	83131	57024	82148	14	4
20	47	51179	85911	52671	85005	54146	84072	55605	83115	57047	82132	13	3
20	48	51204	85896	52696	84989	54171	84057	55630	83098	57071	82115	12	3
20	49	51229	85881	52720	84974	54195	84041	55654	83082	57095	82098	11	3
21	50	51254	85866	52745	84959	54220	84025	55678	83066	57119	82082	10	3
21	51	51279	85851	52770	84943	54244	84009	55702	83050	57143	82065	9	2
22	52	51304	85836	52794	84928	54260	83994	55726	83034	57167	82048	8	2
22	53	51329	85821	52819	84913	54293	83978	55750	83017	57191	82032	7	2
23	54	51354	85806	52844	84897	54317	83962	55775	83001	57215	82015	6	2
23	55	51379	85792	52869	84882	54342	83946	55799	82985	57238	81999	5	1
23	56	51404	85777	52893	84866	54366	83930	55823	82969	57262	81982	4	1
24	57	51429	85762	52918	84851	54391	83915	55847	82953	57286	81965	3	1
24	58	51454	85747	52943	84836	54415	83899	55871	82936	57310	81949	2	1
25	59	51479	85732	52967	84820	54440	83883	55895	82920	57334	81932	1	0
25	60	51504	85717	52992	84805	54464	83867	55919	82904	57358	81915	0	0
		N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	M.	
		59°		58°		57°		56°		55°			

TABLE 41.

Natural Sines and Cosines.

Prop. parts		35°		36°		37°		38°		39°			Prop. parts
23	M.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.		18
0	0	57358	81915	58779	80902	60182	79864	61566	78801	62932	77715	60	18
0	1	57381	81899	58802	80885	60205	79846	61589	78783	62955	77696	59	18
1	2	57405	81882	58826	80867	60228	79829	61612	78765	62977	77678	58	17
1	3	57429	81865	58849	80850	60251	79811	61635	78747	63000	77660	57	17
2	4	57453	81848	58873	80833	60274	79793	61658	78729	63022	77641	56	17
2	5	57477	81832	58896	80816	60298	79776	61681	78711	63045	77623	55	17
2	6	57501	81815	58920	80799	60321	79758	61704	78694	63068	77605	54	16
3	7	57524	81798	58943	80782	60344	79741	61726	78676	63090	77586	53	16
3	8	57548	81782	58967	80765	60367	79723	61749	78658	63113	77568	52	16
3	9	57572	81765	58990	80748	60390	79706	61772	78640	63135	77550	51	15
4	10	57596	81748	59014	80730	60414	79688	61795	78622	63158	77531	50	15
4	11	57619	81731	59037	80713	60437	79671	61818	78604	63180	77513	49	15
5	12	57643	81714	59061	80696	60460	79653	61841	78586	63203	77494	48	14
5	13	57667	81698	59084	80679	60483	79635	61864	78568	63225	77476	47	14
5	14	57691	81681	59108	80662	60506	79618	61887	78550	63248	77458	46	14
6	15	57715	81664	59131	80644	60529	79600	61909	78532	63271	77439	45	14
6	16	57738	81647	59154	80627	60553	79583	61932	78514	63293	77421	44	13
7	17	57762	81631	59178	80610	60576	79565	61955	78496	63316	77402	43	13
7	18	57786	81614	59201	80593	60599	79547	61978	78478	63338	77384	42	13
7	19	57810	81597	59225	80576	60622	79530	62001	78460	63361	77366	41	12
8	20	57833	81580	59248	80558	60645	79512	62024	78442	63383	77347	40	12
8	21	57857	81563	59272	80541	60668	79494	62046	78424	63406	77329	39	12
8	22	57881	81546	59295	80524	60691	79477	62069	78405	63428	77310	38	11
9	23	57904	81530	59318	80507	60714	79459	62092	78387	63451	77292	37	11
9	24	57928	81513	59342	80489	60738	79441	62115	78369	63473	77273	36	11
10	25	57952	81496	59365	80472	60761	79424	62138	78351	63496	77255	35	11
10	26	57976	81479	59389	80455	60784	79406	62160	78333	63518	77236	34	10
10	27	57999	81462	59412	80438	60807	79388	62183	78315	63540	77218	33	10
11	28	58023	81445	59436	80420	60830	79371	62206	78297	63563	77199	32	10
11	29	58047	81428	59459	80403	60853	79353	62229	78279	63585	77181	31	9
12	30	58070	81412	59482	80386	60876	79335	62251	78261	63608	77162	30	9
12	31	58094	81395	59506	80368	60899	79318	62274	78243	63630	77144	29	9
12	32	58118	81378	59529	80351	60922	79300	62297	78225	63653	77125	28	8
13	33	58141	81361	59552	80334	60945	79282	62320	78206	63675	77107	27	8
13	34	58165	81344	59576	80316	60968	79264	62342	78188	63698	77088	26	8
13	35	58189	81327	59599	80299	60991	79247	62365	78170	63720	77070	25	8
14	36	58212	81310	59622	80282	61015	79229	62388	78152	63742	77051	24	7
14	37	58236	81293	59646	80264	61038	79211	62411	78134	63765	77033	23	7
15	38	58260	81276	59669	80247	61061	79193	62433	78116	63787	77014	22	7
15	39	58283	81259	59698	80230	61084	79176	62456	78098	63810	76996	21	6
15	40	58307	81242	59716	80212	61107	79158	62479	78079	63832	76977	20	6
16	41	58330	81225	59739	80195	61130	79140	62502	78061	63854	76959	19	6
16	42	58354	81208	59763	80178	61153	79122	62524	78043	63877	76940	18	5
16	43	58378	81191	59786	80160	61176	79105	62547	78025	63899	76921	17	5
17	44	58401	81174	59809	80143	61199	79087	62570	78007	63922	76903	16	5
17	45	58425	81157	59832	80125	61222	79069	62592	77988	63944	76884	15	5
18	46	58449	81140	59856	80108	61245	79051	62615	77970	63966	76866	14	4
18	47	58472	81123	59879	80091	61268	79033	62638	77952	63989	76847	13	4
18	48	58496	81106	59902	80073	61291	79016	62660	77934	64011	76828	12	4
19	49	58519	81089	59926	80056	61314	78998	62683	77916	64033	76810	11	3
19	50	58543	81072	59949	80038	61337	78980	62706	77897	64056	76791	10	3
20	51	58567	81055	59972	80021	61360	78962	62728	77879	64078	76772	9	3
20	52	58590	81038	59995	80003	61383	78944	62751	77861	64100	76754	8	2
20	53	58614	81021	60019	79986	61406	78926	62774	77843	64123	76735	7	2
21	54	58637	81004	60042	79968	61429	78908	62796	77824	64145	76717	6	2
21	55	58661	80987	60065	79951	61451	78891	62819	77806	64167	76698	5	2
21	56	58684	80970	60089	79934	61474	78873	62842	77788	64190	76679	4	1
22	57	58708	80953	60112	79916	61497	78855	62864	77769	64212	76661	3	1
22	58	58731	80936	60135	79899	61520	78837	62887	77751	64234	76642	2	1
23	59	58755	80919	60158	79881	61543	78819	62909	77733	64256	76623	1	0
23	60	58779	80902	60182	79864	61566	78801	62932	77715	64279	76604	0	0
		N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	M.	
		54°		53°		52°		51°		50°			

TABLE 41.

Natural Sines and Cosines.

Prop. parts 22		40°		41°		42°		43°		44°			Prop. parts 19
	M.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.		
0	0	64279	76604	65606	75471	66913	74314	68200	73135	69466	71934	60	19
0	1	64301	76586	65628	75452	66935	74295	68221	73116	69487	71914	59	19
1	2	64323	76567	65650	75433	66956	74276	68242	73096	69508	71894	58	18
1	3	64346	76548	65672	75414	66978	74256	68264	73076	69529	71873	57	18
1	4	64368	76530	65694	75395	66999	74237	68285	73056	69549	71853	56	18
2	5	64390	76511	65716	75375	67021	74217	68306	73036	69570	71833	55	17
2	6	64412	76492	65738	75356	67043	74198	68327	73016	69591	71813	54	17
3	7	64435	76473	65759	75337	67064	74178	68349	72996	69612	71792	53	17
3	8	64457	76455	65781	75318	67086	74159	68370	72976	69633	71772	52	16
3	9	64479	76436	65803	75299	67107	74139	68391	72957	69654	71752	51	16
4	10	64501	76417	65825	75280	67129	74120	68412	72937	69675	71732	50	16
4	11	64524	76398	65847	75261	67151	74100	68434	72917	69696	71711	49	16
4	12	64546	76380	65869	75241	67172	74080	68455	72897	69717	71691	48	15
5	13	64568	76361	65891	75222	67194	74061	68476	72877	69737	71671	47	15
5	14	64590	76342	65913	75203	67215	74041	68497	72857	69758	71650	46	15
6	15	64612	76323	65935	75184	67237	74022	68518	72837	69779	71630	45	14
6	16	64635	76304	65956	75165	67258	74002	68539	72817	69800	71610	44	14
6	17	64657	76286	65978	75146	67280	73983	68561	72797	69821	71590	43	14
7	18	64679	76267	66000	75126	67301	73963	68582	72777	69842	71569	42	13
7	19	64701	76248	66022	75107	67323	73944	68603	72757	69862	71549	41	13
7	20	64723	76229	66044	75088	67344	73924	68624	72737	69883	71529	40	13
8	21	64746	76210	66066	75069	67366	73904	68645	72717	69904	71508	39	12
8	22	64768	76192	66088	75050	67387	73885	68666	72697	69925	71488	38	12
8	23	64790	76173	66109	75030	67409	73865	68688	72677	69946	71468	37	12
9	24	64812	76154	66131	75011	67430	73846	68709	72657	69966	71447	36	11
9	25	64834	76135	66153	74992	67452	73826	68730	72637	69987	71427	35	11
10	26	64856	76116	66175	74973	67473	73806	68751	72617	70008	71407	34	11
10	27	64878	76097	66197	74953	67495	73787	68772	72597	70029	71386	33	10
10	28	64901	76078	66218	74934	67516	73767	68793	72577	70049	71366	32	10
11	29	64923	76059	66240	74915	67538	73747	68814	72557	70070	71345	31	10
11	30	64945	76041	66262	74896	67559	73728	68835	72537	70091	71325	30	10
11	31	64967	76022	66284	74876	67580	73708	68857	72517	70112	71305	29	9
12	32	64989	76003	66306	74857	67602	73688	68878	72497	70132	71284	28	9
12	33	65011	75984	66327	74838	67623	73669	68899	72477	70153	71264	27	9
12	34	65033	75965	66349	74818	67645	73649	68920	72457	70174	71243	26	8
13	35	65055	75946	66371	74799	67666	73629	68941	72437	70195	71223	25	8
13	36	65077	75927	66393	74780	67688	73610	68962	72417	70215	71203	24	8
14	37	65100	75908	66414	74760	67709	73590	68983	72397	70236	71182	23	7
14	38	65122	75889	66436	74741	67730	73570	69004	72377	70257	71162	22	7
14	39	65144	75870	66458	74722	67752	73551	69025	72357	70277	71141	21	7
15	40	65166	75851	66480	74703	67773	73531	69046	72337	70298	71121	20	6
15	41	65188	75832	66501	74683	67795	73511	69067	72317	70319	71100	19	6
15	42	65210	75813	66523	74664	67816	73491	69088	72297	70339	71080	18	6
16	43	65232	75794	66545	74644	67837	73472	69109	72277	70360	71059	17	5
16	44	65254	75775	66566	74625	67859	73452	69130	72257	70381	71039	16	5
17	45	65276	75756	66588	74606	67880	73432	69151	72236	70401	71019	15	5
17	46	65298	75738	66610	74586	67901	73413	69172	72216	70422	70998	14	4
17	47	65320	75719	66632	74567	67923	73393	69193	72196	70443	70978	13	4
18	48	65342	75700	66653	74548	67944	73373	69214	72176	70463	70957	12	4
18	49	65364	75680	66675	74528	67965	73353	69235	72156	70484	70937	11	3
18	50	65386	75661	66697	74509	67987	73333	69256	72136	70505	70916	10	3
19	51	65408	75642	66718	74489	68008	73314	69277	72116	70525	70896	9	3
19	52	65430	75623	66740	74470	68029	73294	69298	72095	70546	70875	8	3
19	53	65452	75604	66762	74451	68051	73274	69319	72075	70567	70855	7	2
20	54	65474	75585	66783	74431	68072	73254	69340	72055	70587	70834	6	2
20	55	65496	75566	66805	74412	68093	73234	69361	72035	70608	70813	5	2
21	56	65518	75547	66827	74392	68115	73215	69382	72015	70628	70793	4	1
21	57	65540	75528	66848	74373	68136	73195	69403	71995	70649	70772	3	1
21	58	65562	75509	66870	74353	68157	73175	69424	71974	70670	70752	2	1
22	59	65584	75490	66891	74334	68179	73155	69445	71954	70690	70731	1	0
22	60	65606	75471	66913	74314	68200	73135	69466	71934	70711	70711	0	0
		N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	N. cos.	N. sine.	M.	
		49°		48°		47°		46°		45°			

TABLE 42.

Logarithms of Numbers.

No. 1——100. Log. 0.00000——2.00000.

No.	Log.	No.	Log.	No.	Log.	No.	Log.	No.	Log.
1	0.00000	21	1.32222	41	1.61278	61	1.78533	81	1.90849
2	0.30103	22	1.34242	42	1.62325	62	1.79239	82	1.91381
3	0.47712	23	1.36173	43	1.63347	63	1.79934	83	1.91908
4	0.60206	24	1.38021	44	1.64345	64	1.80618	84	1.92428
5	0.69897	25	1.39794	45	1.65321	65	1.81291	85	1.92942
6	0.77815	26	1.41497	46	1.66276	66	1.81954	86	1.93450
7	0.84510	27	1.43136	47	1.67210	67	1.82607	87	1.93952
8	0.90309	28	1.44716	48	1.68124	68	1.83251	88	1.94448
9	0.95424	29	1.46240	49	1.69020	69	1.83885	89	1.94939
10	1.00000	30	1.47712	50	1.69897	70	1.84510	90	1.95424
11	1.04139	31	1.49136	51	1.70757	71	1.85126	91	1.95904
12	1.07918	32	1.50515	52	1.71600	72	1.85733	92	1.96379
13	1.11394	33	1.51851	53	1.72428	73	1.86332	93	1.96848
14	1.14613	34	1.53148	54	1.73239	74	1.86923	94	1.97313
15	1.17609	35	1.54407	55	1.74036	75	1.87506	95	1.97772
16	1.20412	36	1.55630	56	1.74819	76	1.88081	96	1.98227
17	1.23045	37	1.56820	57	1.75587	77	1.88649	97	1.98677
18	1.25527	38	1.57978	58	1.76343	78	1.89209	98	1.99123
19	1.27875	39	1.59106	59	1.77085	79	1.89763	99	1.99564
20	1.30103	40	1.60206	60	1.77815	80	1.90309	100	2.00000

TABLE 42.

Logarithms of Numbers.

No. 100——1600. Log. 00000——20412.

No.	0	1	2	3	4	5	6	7	8	9
100	00000	00043	00087	00130	00173	00217	00260	00303	00346	00389
101	00432	00475	00518	00561	00604	00647	00689	00732	00775	00817
102	00860	00903	00945	00988	01030	01072	01115	01157	01199	01242
103	01284	01326	01368	01410	01452	01494	01536	01578	01620	01662
104	01703	01745	01787	01828	01870	01912	01953	01995	02036	02078
105	02119	02160	02202	02243	02284	02325	02366	02407	02449	02490
106	02531	02572	02612	02653	02694	02735	02776	02816	02857	02898
107	02938	02979	03019	03060	03100	03141	03181	03222	03262	03302
108	03342	03383	03423	03463	03503	03543	03583	03623	03663	03703
109	03743	03782	03822	03862	03902	03941	03981	04021	04060	04100
110	04139	04179	04218	04258	04297	04336	04376	04415	04454	04493
111	04532	04571	04610	04650	04689	04727	04766	04805	04844	04883
112	04922	04961	04999	05038	05077	05115	05154	05192	05231	05269
113	05308	05346	05385	05423	05461	05500	05538	05576	05614	05652
114	05690	05729	05767	05805	05843	05881	05918	05956	05994	06032
115	06070	06108	06145	06183	06221	06258	06296	06333	06371	06408
116	06446	06483	06521	06558	06595	06633	06670	06707	06744	06781
117	06819	06856	06893	06930	06967	07004	07041	07078	07115	07151
118	07188	07225	07262	07298	07335	07372	07408	07445	07482	07518
119	07555	07591	07628	07664	07700	07737	07773	07809	07846	07882
120	07918	07954	07990	08027	08063	08099	08135	08171	08207	08243
121	08279	08314	08350	08386	08422	08458	08493	08529	08565	08600
122	08636	08672	08707	08743	08778	08814	08849	08884	08920	08955
123	08991	09026	09061	09096	09132	09167	09202	09237	09272	09307
124	09342	09377	09412	09447	09482	09517	09552	09587	09621	09656
125	09691	09726	09760	09795	09830	09864	09899	09934	09968	10003
126	10037	10072	10106	10140	10175	10209	10243	10278	10312	10346
127	10380	10415	10449	10483	10517	10551	10585	10619	10653	10687
128	10721	10755	10789	10823	10857	10890	10924	10958	10992	11025
129	11059	11093	11126	11160	11193	11227	11261	11294	11327	11361
130	11394	11428	11461	11494	11528	11561	11594	11628	11661	11694
131	11727	11760	11793	11826	11860	11893	11926	11959	11992	12024
132	12057	12090	12123	12156	12189	12222	12254	12287	12320	12352
133	12385	12418	12450	12483	12516	12548	12581	12613	12646	12678
134	12710	12743	12775	12808	12840	12872	12905	12937	12969	13001
135	13033	13066	13098	13130	13162	13194	13226	13258	13290	13322
136	13354	13386	13418	13450	13481	13513	13545	13577	13609	13640
137	13672	13704	13735	13767	13799	13830	13862	13893	13925	13956
138	13988	14019	14051	14082	14114	14145	14176	14208	14239	14270
139	14301	14333	14364	14395	14426	14457	14489	14520	14551	14582
140	14613	14644	14675	14706	14737	14768	14799	14829	14860	14891
141	14922	14953	14983	15014	15045	15076	15106	15137	15168	15198
142	15229	15259	15290	15320	15351	15381	15412	15442	15473	15503
143	15534	15564	15594	15625	15655	15685	15715	15746	15776	15806
144	15836	15866	15897	15927	15957	15987	16017	16047	16077	16107
145	16137	16167	16197	16227	16256	16286	16316	16346	16376	16406
146	16435	16465	16495	16524	16554	16584	16613	16643	16673	16702
147	16732	16761	16791	16820	16850	16879	16909	16938	16967	16997
148	17026	17056	17085	17114	17143	17173	17202	17231	17260	17289
149	17319	17348	17377	17406	17435	17464	17493	17522	17551	17580
150	17609	17638	17667	17696	17725	17754	17782	17811	17840	17869
151	17898	17926	17955	17984	18013	18041	18070	18099	18127	18156
152	18184	18213	18241	18270	18298	18327	18355	18384	18412	18441
153	18469	18498	18526	18554	18583	18611	18639	18667	18696	18724
154	18752	18780	18808	18837	18865	18893	18921	18949	18977	19005
155	19033	19061	19089	19117	19145	19173	19201	19229	19257	19285
156	19312	19340	19368	19396	19424	19451	19479	19507	19535	19562
157	19590	19618	19645	19673	19700	19728	19756	19783	19811	19838
158	19866	19893	19921	19948	19976	20003	20030	20058	20085	20112
159	20140	20167	20194	20222	20249	20276	20303	20330	20358	20385
No.	0	1	2	3	4	5	6	7	8	9

	43	42
1	4	4
2	9	8
3	13	13
4	17	17
5	22	21
6	26	25
7	30	29
8	34	34
9	39	38

	41	40
1	4	4
2	8	8
3	12	12
4	16	16
5	21	20
6	25	24
7	29	28
8	33	32
9	37	36

	39	38
1	4	4
2	8	8
3	12	11
4	16	15
5	20	19
6	23	23
7	27	27
8	31	30
9	35	34

	37	36
1	4	4
2	7	7
3	11	11
4	15	14
5	19	18
6	22	22
7	26	25
8	30	29
9	33	32

	35	34
1	4	3
2	7	7
3	11	10
4	14	14
5	18	17
6	21	20
7	25	24
8	28	27
9	32	31

	33	32
1	3	3
2	7	6
3	10	10
4	13	13
5	17	16
6	20	19
7	23	22
8	26	26
9	30	29

TABLE 42.

Logarithms of Numbers.

No. 1600——2200. Log. 20412——34242.

No.	0	1	2	3	4	5	6	7	8	9
160	20412	20439	20466	20493	20520	20548	20575	20602	20629	20656
161	20683	20710	20737	20763	20790	20817	20844	20871	20898	20925
162	20952	20978	21005	21032	21059	21085	21112	21139	21165	21192
163	21219	21245	21272	21299	21325	21352	21378	21405	21431	21458
164	21484	21511	21537	21564	21590	21617	21643	21669	21696	21722
165	21748	21775	21801	21827	21854	21880	21906	21932	21958	21985
166	22011	22037	22063	22089	22115	22141	22167	22194	22220	22246
167	22272	22298	22324	22350	22376	22401	22427	22453	22479	22505
168	22531	22557	22583	22608	22634	22660	22686	22712	22737	22763
169	22789	22814	22840	22866	22891	22917	22943	22968	22994	23019
170	23045	23070	23096	23121	23147	23172	23198	23223	23249	23274
171	23300	23325	23350	23376	23401	23426	23452	23477	23502	23528
172	23553	23578	23603	23629	23654	23679	23704	23729	23754	23779
173	23805	23830	23855	23880	23905	23930	23955	23980	24005	24030
174	24055	24080	24105	24130	24155	24180	24204	24229	24254	24279
175	24304	24329	24353	24378	24403	24428	24452	24477	24502	24527
176	24551	24576	24601	24625	24650	24674	24699	24724	24748	24773
177	24797	24822	24846	24871	24895	24920	24944	24969	24993	25018
178	25042	25066	25091	25115	25139	25164	25188	25212	25237	25261
179	25285	25310	25334	25358	25382	25406	25431	25455	25479	25503
180	25527	25551	25575	25600	25624	25648	25672	25696	25720	25744
181	25768	25792	25816	25840	25864	25888	25912	25935	25959	25983
182	26007	26031	26055	26079	26102	26126	26150	26174	26198	26221
183	26245	26269	26293	26316	26340	26364	26387	26411	26435	26458
184	26482	26505	26529	26553	26576	26600	26623	26647	26670	26694
185	26717	26741	26764	26788	26811	26834	26858	26881	26905	26928
186	26951	26975	26998	27021	27045	27068	27091	27114	27138	27161
187	27184	27207	27231	27254	27277	27300	27323	27346	27370	27393
188	27416	27439	27462	27485	27508	27531	27554	27577	27600	27623
189	27646	27669	27692	27715	27738	27761	27784	27807	27830	27852
190	27875	27898	27921	27944	27967	27989	28012	28035	28058	28081
191	28103	28126	28149	28171	28194	28217	28240	28262	28285	28307
192	28330	28353	28375	28398	28421	28443	28466	28488	28511	28533
193	28556	28578	28601	28623	28646	28668	28691	28713	28735	28758
194	28780	28803	28825	28847	28870	28892	28914	28937	28959	28981
195	29003	29026	29048	29070	29092	29115	29137	29159	29181	29203
196	29226	29248	29270	29292	29314	29336	29358	29380	29403	29425
197	29447	29469	29491	29513	29535	29557	29579	29601	29623	29645
198	29667	29688	29710	29732	29754	29776	29798	29820	29842	29863
199	29885	29907	29929	29951	29973	29994	30016	30038	30060	30081
200	30103	30125	30146	30168	30190	30211	30233	30255	30276	30298
201	30320	30341	30363	30384	30406	30428	30449	30471	30492	30514
202	30535	30557	30578	30600	30621	30643	30664	30685	30707	30728
203	30750	30771	30792	30814	30835	30856	30878	30899	30920	30942
204	30963	30984	31006	31027	31048	31069	31091	31112	31133	31154
205	31175	31197	31218	31239	31260	31281	31302	31323	31345	31366
206	31387	31408	31429	31450	31471	31492	31513	31534	31555	31576
207	31597	31618	31639	31660	31681	31702	31723	31744	31765	31785
208	31806	31827	31848	31869	31890	31911	31931	31952	31973	31994
209	32015	32035	32056	32077	32098	32118	32139	32160	32181	32201
210	32222	32243	32263	32284	32305	32325	32346	32366	32387	32408
211	32428	32449	32469	32490	32510	32531	32552	32572	32593	32613
212	32634	32654	32675	32695	32715	32736	32756	32777	32797	32818
213	32838	32858	32879	32899	32919	32940	32960	32980	33001	33021
214	33041	33062	33082	33102	33122	33143	33163	33183	33203	33224
215	33244	33264	33284	33304	33325	33345	33365	33385	33405	33425
216	33445	33465	33486	33506	33526	33546	33566	33586	33606	33626
217	33646	33666	33686	33706	33726	33746	33766	33786	33806	33826
218	33846	33866	33885	33905	33925	33945	33965	33985	34005	34025
219	34044	34064	34084	34104	34124	34143	34163	34183	34203	34223
No.	0	1	2	3	4	5	6	7	8	9

	31	30
1	3	3
2	6	6
3	9	9
4	12	12
5	16	15
6	19	18
7	22	21
8	25	24
9	28	27

	29	28
1	3	3
2	6	6
3	9	8
4	12	11
5	15	14
6	17	17
7	20	20
8	23	22
9	26	25

	27	26
1	3	3
2	5	5
3	8	8
4	11	10
5	14	13
6	16	16
7	19	18
8	22	21
9	24	23

	25	24
1	3	2
2	5	5
3	8	7
4	10	10
5	13	12
6	15	14
7	18	17
8	20	19
9	23	22

	23	22
1	2	2
2	5	4
3	7	7
4	9	9
5	12	11
6	14	13
7	16	15
8	18	18
9	21	20

	21	20
1	2	2
2	4	4
3	6	6
4	8	8
5	11	10
6	13	12
7	15	14
8	17	16
9	19	18

7765°—11——17

TABLE 42.

Logarithms of Numbers.

No. 2200——2800. Log. 34242——44716.

No.	0	1	2	3	4	5	6	7	8	9
220	34242	34262	34282	34301	34321	34341	34361	34380	34400	34420
221	34439	34459	34479	34498	34518	34537	34557	34577	34596	34616
222	34635	34655	34674	34694	34713	34733	34753	34772	34792	34811
223	34830	34850	34869	34889	34908	34928	34947	34967	34986	35005
224	35025	35044	35064	35083	35102	35122	35141	35160	35180	35199
225	35218	35238	35257	35276	35295	35315	35334	35353	35372	35392
226	35411	35430	35449	35468	35488	35507	35526	35545	35564	35583
227	35603	35622	35641	35660	35679	35698	35717	35736	35755	35774
228	35793	35813	35832	35851	35870	35889	35908	35927	35946	35965
229	35984	36003	36021	36040	36059	36078	36097	36116	36135	36154
230	36173	36192	36211	36229	36248	36267	36286	36305	36324	36342
231	36361	36380	36399	36418	36436	36455	36474	36493	36511	36530
232	36549	36568	36586	36605	36624	36642	36661	36680	36698	36717
233	36736	36754	36773	36791	36810	36829	36847	36866	36884	36903
234	36922	36940	36959	36977	36996	37014	37033	37051	37070	37088
235	37107	37125	37144	37162	37181	37199	37218	37236	37254	37273
236	37291	37310	37328	37346	37365	37383	37401	37420	37438	37457
237	37475	37493	37511	37530	37548	37566	37585	37603	37621	37639
238	37658	37676	37694	37712	37731	37749	37767	37785	37803	37822
239	37840	37858	37876	37894	37912	37931	37949	37967	37985	38003
240	38021	38039	38057	38075	38093	38112	38130	38148	38166	38184
241	38202	38220	38238	38256	38274	38292	38310	38328	38346	38364
242	38382	38399	38417	38435	38453	38471	38489	38507	38525	38543
243	38561	38578	38596	38614	38632	38650	38668	38686	38703	38721
244	38739	38757	38775	38792	38810	38828	38846	38863	38881	38899
245	38917	38934	38952	38970	38987	39005	39023	39041	39058	39076
246	39094	39111	39129	39146	39164	39182	39199	39217	39235	39252
247	39270	39287	39305	39322	39340	39358	39375	39393	39410	39428
248	39445	39463	39480	39498	39515	39533	39550	39568	39585	39602
249	39620	39637	39655	39672	39690	39707	39724	39742	39759	39777
250	39794	39811	39829	39846	39863	39881	39898	39915	39933	39950
251	39967	39985	40002	40019	40037	40054	40071	40088	40106	40123
252	40140	40157	40175	40192	40209	40226	40243	40261	40278	40295
253	40312	40329	40346	40364	40381	40398	40415	40432	40449	40466
254	40483	40500	40518	40535	40552	40569	40586	40603	40620	40637
255	40654	40671	40688	40705	40722	40739	40756	40773	40790	40807
256	40824	40841	40858	40875	40892	40909	40926	40943	40960	40976
257	40993	41010	41027	41044	41061	41078	41095	41111	41128	41145
258	41162	41179	41196	41212	41229	41246	41263	41280	41296	41313
259	41330	41347	41363	41380	41397	41414	41430	41447	41464	41481
260	41497	41514	41531	41547	41564	41581	41597	41614	41631	41647
261	41664	41681	41697	41714	41731	41747	41764	41780	41797	41814
262	41830	41847	41863	41880	41896	41913	41929	41946	41963	41979
263	41996	42012	42029	42045	42062	42078	42095	42111	42127	42144
264	42160	42177	42193	42210	42226	42243	42259	42275	42292	42308
265	42325	42341	42357	42374	42390	42406	42423	42439	42455	42472
266	42488	42504	42521	42537	42553	42570	42586	42602	42619	42635
267	42651	42667	42684	42700	42716	42732	42749	42765	42781	42797
268	42813	42830	42846	42862	42878	42894	42911	42927	42943	42959
269	42975	42991	43008	43024	43040	43056	43072	43088	43104	43120
270	43136	43152	43169	43185	43201	43217	43233	43249	43265	43281
271	43297	43313	43329	43345	43361	43377	43393	43409	43425	43441
272	43457	43473	43489	43505	43521	43537	43553	43569	43584	43600
273	43616	43632	43648	43664	43680	43696	43712	43727	43743	43759
274	43775	43791	43807	43823	43838	43854	43870	43886	43902	43917
275	43933	43949	43965	43981	43996	44012	44028	44044	44059	44075
276	44091	44107	44122	44138	44154	44170	44185	44201	44217	44232
277	44248	44264	44279	44295	44311	44326	44342	44358	44373	44389
278	44404	44420	44436	44451	44467	44483	44498	44514	44529	44545
279	44560	44576	44592	44607	44623	44638	44654	44669	44685	44700
No.	0	1	2	3	4	5	6	7	8	9

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TABLE 42.

Logarithms of Numbers.

No. 2800——3400. Log. 44716——53148.

No.	0	1	2	3	4	5	6	7	8	9
280	44716	44731	44747	44762	44778	44793	44809	44824	44840	44855
281	44871	44886	44902	44917	44932	44948	44963	44979	44994	45010
282	45025	45040	45056	45071	45086	45102	45117	45133	45148	45163
283	45179	45194	45209	45225	45240	45255	45271	45286	45301	45317
284	45332	45347	45362	45378	45393	45408	45423	45439	45454	45469
285	45484	45500	45515	45530	45545	45561	45576	45591	45606	45621
286	45637	45652	45667	45682	45697	45712	45728	45743	45758	45773
287	45788	45803	45818	45834	45849	45864	45879	45894	45909	45924
288	45939	45954	45969	45984	46000	46015	46030	46045	46060	46075
289	46090	46105	46120	46135	46150	46165	46180	46195	46210	46225
290	46240	46255	46270	46285	46300	46315	46330	46345	46359	46374
291	46389	46404	46419	46434	46449	46464	46479	46494	46509	46523
292	46538	46553	46568	46583	46598	46613	46627	46642	46657	46672
293	46687	46702	46716	46731	46746	46761	46776	46790	46805	46820
294	46835	46850	46864	46879	46894	46909	46923	46938	46953	46967
295	46982	46997	47012	47026	47041	47056	47070	47085	47100	47114
296	47129	47144	47159	47173	47188	47202	47217	47232	47246	47261
297	47276	47290	47305	47319	47334	47349	47363	47378	47392	47407
298	47422	47436	47451	47465	47480	47494	47509	47524	47538	47553
299	47567	47582	47596	47611	47625	47640	47654	47669	47683	47698
300	47712	47727	47741	47756	47770	47784	47799	47813	47828	47842
301	47857	47871	47885	47900	47914	47929	47943	47958	47972	47986
302	48001	48015	48029	48044	48058	48073	48087	48101	48116	48130
303	48144	48159	48173	48187	48202	48216	48230	48244	48259	48273
304	48287	48302	48316	48330	48344	48359	48373	48387	48401	48416
305	48430	48444	48458	48473	48487	48501	48515	48530	48544	48558
306	48572	48586	48601	48615	48629	48643	48657	48671	48686	48700
307	48714	48728	48742	48756	48770	48785	48799	48813	48827	48841
308	48855	48869	48883	48897	48911	48926	48940	48954	48968	48982
309	48996	49010	49024	49038	49052	49066	49080	49094	49108	49122
310	49136	49150	49164	49178	49192	49206	49220	49234	49248	49262
311	49276	49290	49304	49318	49332	49346	49360	49374	49388	49402
312	49415	49429	49443	49457	49471	49485	49499	49513	49527	49541
313	49554	49568	49582	49596	49610	49624	49638	49651	49665	49679
314	49693	49707	49721	49734	49748	49762	49776	49790	49803	49817
315	49831	49845	49859	49872	49886	49900	49914	49927	49941	49955
316	49969	49982	49996	50010	50024	50037	50051	50065	50079	50092
317	50106	50120	50133	50147	50161	50174	50188	50202	50215	50229
318	50243	50256	50270	50284	50297	50311	50325	50338	50352	50365
319	50379	50393	50406	50420	50433	50447	50461	50474	50488	50501
320	50515	50529	50542	50556	50569	50583	50596	50610	50623	50637
321	50651	50664	50678	50691	50705	50718	50732	50745	50759	50772
322	50786	50799	50813	50826	50840	50853	50866	50880	50893	50907
323	50920	50934	50947	50961	50974	50987	51001	51014	51028	51041
324	51055	51068	51081	51095	51108	51121	51135	51148	51162	51175
325	51188	51202	51215	51228	51242	51255	51268	51282	51295	51308
326	51322	51335	51348	51362	51375	51388	51402	51415	51428	51441
327	51455	51468	51481	51495	51508	51521	51534	51548	51561	51574
328	51587	51601	51614	51627	51640	51654	51667	51680	51693	51706
329	51720	51733	51746	51759	51772	51786	51799	51812	51825	51838
330	51851	51865	51878	51891	51904	51917	51930	51943	51957	51970
331	51983	51996	52009	52022	52035	52048	52061	52075	52088	52101
332	52114	52127	52140	52153	52166	52179	52192	52205	52218	52231
333	52244	52257	52270	52284	52297	52310	52323	52336	52349	52362
334	52375	52388	52401	52414	52427	52440	52453	52466	52479	52492
335	52504	52517	52530	52543	52556	52569	52582	52595	52608	52621
336	52634	52647	52660	52673	52686	52699	52711	52724	52737	52750
337	52763	52776	52789	52802	52815	52827	52840	52853	52866	52879
338	52892	52905	52917	52930	52943	52956	52969	52982	52994	53007
339	53020	53033	53046	53058	53071	53084	53097	53110	53122	53135
No.	0	1	2	3	4	5	6	7	8	9

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TABLE 42.

Logarithms of Numbers.

No. 3400——4000. Log. 53148——60206.

No.	0	1	2	3	4	5	6	7	8	9
340	53148	53161	53173	53186	53199	53212	53224	53237	53250	53263
341	53275	53288	53301	53314	53326	53339	53352	53364	53377	53390
342	53403	53415	53428	53441	53453	53466	53479	53491	53504	53517
343	53529	53542	53555	53567	53580	53593	53605	53618	53631	53643
344	53656	53668	53681	53694	53706	53719	53732	53744	53757	53769
345	53782	53794	53807	53820	53832	53845	53857	53870	53882	53895
346	53908	53920	53933	53945	53958	53970	53983	53995	54008	54020
347	54033	54045	54058	54070	54083	54095	54108	54120	54133	54145
348	54158	54170	54183	54195	54208	54220	54233	54245	54258	54270
349	54283	54295	54307	54320	54332	54345	54357	54370	54382	54394
350	54407	54419	54432	54444	54456	54469	54481	54494	54506	54518
351	54531	54543	54555	54568	54580	54593	54605	54617	54630	54642
352	54654	54667	54679	54691	54704	54716	54728	54741	54753	54765
353	54777	54790	54802	54814	54827	54839	54851	54864	54876	54888
354	54900	54913	54925	54937	54949	54962	54974	54986	54998	55011
355	55023	55035	55047	55060	55072	55084	55096	55108	55121	55133
356	55145	55157	55169	55182	55194	55206	55218	55230	55242	55255
357	55267	55279	55291	55303	55315	55328	55340	55352	55364	55376
358	55388	55400	55413	55425	55437	55449	55461	55473	55485	55497
359	55509	55522	55534	55546	55558	55570	55582	55594	55606	55618
360	55630	55642	55654	55666	55678	55691	55703	55715	55727	55739
361	55751	55763	55775	55787	55799	55811	55823	55835	55847	55859
362	55871	55883	55895	55907	55919	55931	55943	55955	55967	55979
363	55991	56003	56015	56027	56038	56050	56062	56074	56086	56098
364	56110	56122	56134	56146	56158	56170	56182	56194	56205	56217
365	56229	56241	56253	56265	56277	56289	56301	56312	56324	56336
366	56348	56360	56372	56384	56396	56407	56419	56431	56443	56455
367	56467	56478	56490	56502	56514	56526	56538	56549	56561	56573
368	56585	56597	56608	56620	56632	56644	56656	56667	56679	56691
369	56703	56714	56726	56738	56750	56761	56773	56785	56797	56808
370	56820	56832	56844	56855	56867	56879	56891	56902	56914	56926
371	56937	56949	56961	56972	56984	56996	57008	57019	57031	57043
372	57054	57066	57078	57089	57101	57113	57124	57136	57148	57159
373	57171	57183	57194	57206	57217	57229	57241	57252	57264	57276
374	57287	57299	57310	57322	57334	57345	57357	57368	57380	57392
375	57403	57415	57426	57438	57449	57461	57473	57484	57496	57507
376	57519	57530	57542	57553	57565	57576	57588	57600	57611	57623
377	57634	57646	57657	57669	57680	57692	57703	57715	57726	57738
378	57749	57761	57772	57784	57795	57807	57818	57830	57841	57852
379	57864	57875	57887	57898	57910	57921	57933	57944	57955	57967
380	57978	57990	58001	58013	58024	58035	58047	58058	58070	58081
381	58092	58104	58115	58127	58138	58149	58161	58172	58184	58195
382	58206	58218	58229	58240	58252	58263	58274	58286	58297	58309
383	58320	58331	58343	58354	58365	58377	58388	58399	58410	58422
384	58433	58444	58456	58467	58478	58490	58501	58512	58524	58535
385	58546	58557	58569	58580	58591	58602	58614	58625	58636	58647
386	58659	58670	58681	58692	58704	58715	58726	58737	58749	58760
387	58771	58782	58794	58805	58816	58827	58838	58850	58861	58872
388	58883	58894	58906	58917	58928	58939	58950	58961	58973	58984
389	58995	59006	59017	59028	59040	59051	59062	59073	59084	59095
390	59106	59118	59129	59140	59151	59162	59173	59184	59195	59207
391	59218	59229	59240	59251	59262	59273	59284	59295	59306	59318
392	59329	59340	59351	59362	59373	59384	59395	59406	59417	59428
393	59439	59450	59461	59472	59483	59494	59506	59517	59528	59539
394	59550	59561	59572	59583	59594	59605	59616	59627	59638	59649
395	59660	59671	59682	59693	59704	59715	59726	59737	59748	59759
396	59770	59780	59791	59802	59813	59824	59835	59846	59857	59868
397	59879	59890	59901	59912	59923	59934	59945	59956	59966	59977
398	59988	59999	60010	60021	60032	60043	60054	60065	60076	60086
399	60097	60108	60119	60130	60141	60152	60163	60173	60184	60195
No.	0	1	2	3	4	5	6	7	8	9

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TABLE 42.

Logarithms of Numbers.

No. 4000——4600. Log. 60206——66276.

No.	0	1	2	3	4	5	6	7	8	9
400	60206	60217	60228	60239	60249	60260	60271	60282	60293	60304
401	60314	60325	60336	60347	60358	60369	60379	60390	60401	60412
402	60423	60433	60444	60455	60466	60477	60487	60498	60509	60520
403	60531	60541	60552	60563	60574	60584	60595	60606	60617	60627
404	60638	60649	60660	60670	60681	60692	60703	60713	60724	60735
405	60746	60756	60767	60778	60788	60799	60810	60821	60831	60842
406	60853	60863	60874	60885	60895	60906	60917	60927	60938	60949
407	60959	60970	60981	60991	61002	61013	61023	61034	61045	61055
408	61066	61077	61087	61098	61109	61119	61130	61140	61151	61162
409	61172	61183	61194	61204	61215	61225	61236	61247	61257	61268
410	61278	61289	61300	61310	61321	61331	61342	61352	61363	61374
411	61384	61395	61405	61416	61426	61437	61448	61458	61469	61479
412	61490	61500	61511	61521	61532	61542	61553	61563	61574	61584
413	61595	61606	61616	61627	61637	61648	61658	61669	61679	61690
414	61700	61711	61721	61731	61742	61752	61763	61773	61784	61794
415	61805	61815	61826	61836	61847	61857	61868	61878	61888	61899
416	61909	61920	61930	61941	61951	61962	61972	61982	61993	62003
417	62014	62024	62034	62045	62055	62066	62076	62086	62097	62107
418	62118	62128	62138	62149	62159	62170	62180	62190	62201	62211
419	62221	62232	62242	62252	62263	62273	62284	62294	62304	62315
420	62325	62335	62346	62356	62366	62377	62387	62397	62408	62418
421	62428	62439	62449	62459	62469	62480	62490	62500	62511	62521
422	62531	62542	62552	62562	62572	62583	62593	62603	62613	62624
423	62634	62644	62655	62665	62675	62685	62696	62706	62716	62726
424	62737	62747	62757	62767	62778	62788	62798	62808	62818	62829
425	62839	62849	62859	62870	62880	62890	62900	62910	62921	62931
426	62941	62951	62961	62972	62982	62992	63002	63012	63022	63033
427	63043	63053	63063	63073	63083	63094	63104	63114	63124	63134
428	63144	63155	63165	63175	63185	63195	63205	63215	63225	63236
429	63246	63256	63266	63276	63286	63296	63306	63317	63327	63337
430	63347	63357	63367	63377	63387	63397	63407	63417	63428	63438
431	63448	63458	63468	63478	63488	63498	63508	63518	63528	63538
432	63548	63558	63568	63579	63589	63599	63609	63619	63629	63639
433	63649	63659	63669	63679	63689	63699	63709	63719	63729	63739
434	63749	63759	63769	63779	63789	63799	63809	63819	63829	63839
435	63849	63859	63869	63879	63889	63899	63909	63919	63929	63939
436	63949	63959	63969	63979	63988	63998	64008	64018	64028	64038
437	64048	64058	64068	64078	64088	64098	64108	64118	64128	64137
438	64147	64157	64167	64177	64187	64197	64207	64217	64227	64237
439	64246	64256	64266	64276	64286	64296	64306	64316	64326	64335
440	64345	64355	64365	64375	64385	64395	64404	64414	64424	64434
441	64444	64454	64464	64473	64483	64493	64503	64513	64523	64532
442	64542	64552	64562	64572	64582	64591	64601	64611	64621	64631
443	64640	64650	64660	64670	64680	64689	64699	64709	64719	64729
444	64738	64748	64758	64768	64777	64787	64797	64807	64816	64826
445	64836	64846	64856	64865	64875	64885	64895	64904	64914	64924
446	64933	64943	[illegible]	64963	64972	64982	64992	65002	65011	65021
447	65031	65040	65050	65060	65070	65079	65089	65099	65108	65118
448	65128	65137	65147	65157	65167	65176	65186	65196	65205	65215
449	65225	65234	65244	65254	65263	65273	65283	65292	65302	65312
450	65321	65331	65341	65350	65360	65369	65379	65389	65398	65408
451	65418	65427	65437	65447	65456	65466	65475	65485	65495	65504
452	65514	65523	65533	65543	65552	65562	65571	65581	65591	65600
453	65610	65619	65629	65639	65648	65658	65667	65677	65686	65696
454	65706	65715	[illegible]	[illegible]	65744	65753	65763	65772	65782	65792
455	65801	65811	[illegible]	[illegible]	65839	65849	65858	65868	65877	65887
456	65896	65906	[illegible]	[illegible]	65935	65944	65954	65963	65973	65982
457	65992	66001	[illegible]	[illegible]	66030	66039	66049	66058	66068	66077
458	66087	66096	[illegible]	[illegible]	66124	66134	66143	66153	66162	66172
459	66181	66191	[illegible]	[illegible]	66219	66229	66238	66247	66257	66266
No.	0	1	2	3	4	5	6	7	8	9

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TABLE 42.

Logarithms of Numbers.

No. 4600——5200. Log. 66276——71600.

No.	0	1	2	3	4	5	6	7	8	9
460	66276	66285	66295	66304	66314	66323	66332	66342	66351	66361
461	66370	66380	66389	66398	66408	66417	66427	66436	66445	66455
462	66464	66474	66483	66492	66502	66511	66521	66530	66539	66549
463	66558	66567	66577	66586	66596	66605	66614	66624	66633	66642
464	66652	66661	66671	66680	66689	66699	66708	66717	66727	66736
465	66745	66755	66764	66773	66783	66792	66801	66811	66820	66829
466	66839	66848	66857	66867	66876	66885	66894	66904	66913	66922
467	66932	66941	66950	66960	66969	66978	66987	66997	67006	67015
468	67025	67034	67043	67052	67062	67071	67080	67089	67099	67108
469	67117	67127	67136	67145	67154	67164	67173	67182	67191	67201
470	67210	67219	67228	67237	67247	67256	67265	67274	67284	67293
471	67302	67311	67321	67330	67339	67348	67357	67367	67376	67385
472	67394	67403	67413	67422	67431	67440	67449	67459	67468	67477
473	67486	67495	67504	67514	67523	67532	67541	67550	67560	67569
474	67578	67587	67596	67605	67614	67624	67633	67642	67651	67660
475	67669	67679	67688	67697	67706	67715	67724	67733	67742	67752
476	67761	67770	67779	67788	67797	67806	67815	67825	67834	67843
477	67852	67861	67870	67879	67888	67897	67906	67916	67925	67934
478	67943	67952	67961	67970	67979	67988	67997	68006	68015	68024
479	68034	68043	68052	68061	68070	68079	68088	68097	68106	68115
480	68124	68133	68142	68151	68160	68169	68178	68187	68196	68205
481	68215	68224	68233	68242	68251	68260	68269	68278	68287	68296
482	68305	68314	68323	68332	68341	68350	68359	68368	68377	68386
483	68395	68404	68413	68422	68431	68440	68449	68458	68467	68476
484	68485	68494	68502	68511	68520	68529	68538	68547	68556	68565
485	68574	68583	68592	68601	68610	68619	68628	68637	68646	68655
486	68664	68673	68681	68690	68699	68708	68717	68726	68735	68744
487	68753	68762	68771	68780	68789	68797	68806	68815	68824	68833
488	68842	68851	68860	68869	68878	68886	68895	68904	68913	68922
489	68931	68940	68949	68958	68966	68975	68984	68993	69002	69011
490	69020	69028	69037	69046	69055	69064	69073	69082	69090	69099
491	69108	69117	69126	69135	69144	69152	69161	69170	69179	69188
492	69197	69205	69214	69223	69232	69241	69249	69258	69267	69276
493	69285	69294	69302	69311	69320	69329	69338	69346	69355	69364
494	69373	69381	69390	69399	69408	69417	69425	69434	69443	69452
495	69461	69469	69478	69487	69496	69504	69513	69522	69531	69539
496	69548	69557	69566	69574	69583	69592	69601	69609	69618	69627
497	69636	69644	69653	69662	69671	69679	69688	69697	69705	69714
498	69723	69732	69740	69749	69758	69767	[illegible]	69784	69793	69801
499	69810	69819	69827	69836	69845	[illegible]	[illegible]	69871	69880	69888
500	69897	69906	69914	69923	69932	[illegible]	[illegible]	69958	69966	69975
501	69984	69992	70001	70010	70018	[illegible]	[illegible]	70044	70053	70062
502	70070	70079	70088	70096	70105	[illegible]	[illegible]	70131	70140	70148
503	70157	70165	70174	70183	70191	[illegible]	[illegible]	70217	70226	70234
504	70243	70252	70260	70269	70278	[illegible]	[illegible]	70303	70312	70321
505	70329	70338	70346	70355	70364	[illegible]	[illegible]	70389	70398	70406
506	70415	70424	70432	70441	70449	[illegible]	[illegible]	70475	70484	70492
507	70501	70509	70518	70526	70535	[illegible]	[illegible]	70561	70569	70578
508	70586	70595	70603	70612	70621	[illegible]	[illegible]	70646	70655	70663
509	70672	70680	70689	70697	70706	[illegible]	[illegible]	70731	70740	70749
510	70757	70766	70774	70783	70791	[illegible]	[illegible]	70817	70825	70834
511	70842	70851	70859	70868	70876	[illegible]	[illegible]	70902	70910	70919
512	70927	70935	70944	70952	70961	[illegible]	[illegible]	70986	70995	71003
513	71012	71020	71029	71037	71046	[illegible]	[illegible]	71071	71079	71088
514	71096	71105	71113	71122	71130	[illegible]	[illegible]	71155	71164	71172
515	71181	71189	71198	71206	71214	[illegible]	[illegible]	71240	71248	71257
516	71265	71273	71282	71290	71299	[illegible]	[illegible]	71324	71332	71341
517	71349	71357	71366	71374	71383	[illegible]	[illegible]	71408	71416	71425
518	71433	71441	71450	71458	71466	[illegible]	[illegible]	71492	71500	71508
519	71517	71525	71533	71542	71550	[illegible]	[illegible]	71575	71584	71592
No.	0	1	2	3	4	5	[illegible]	7	8	9

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TABLE 42.

Logarithms of Numbers.

No. 5200——5800. Log. 71600——76343.

No.	0	1	2	3	4	5	6	7	8	9		
520	71600	71609	71617	71625	71634	71642	71650	71659	71667	71675		9
521	71684	71692	71700	71709	71717	71725	71734	71742	71750	71759		
522	71767	71775	71784	71792	71800	71809	71817	71825	71834	71842	1	1
523	71850	71858	71867	71875	71883	71892	71900	71908	71917	71925	2	2
524	71933	71941	71950	71958	71966	71975	71983	71991	71999	72008	3	3
525	72016	72024	72032	72041	72049	72057	72066	72074	72082	72090	4	4
526	72099	72107	72115	72123	72132	72140	72148	72156	72165	72173	5	5
527	72181	72189	72198	72206	72214	72222	72230	72239	72247	72255	6	5
528	72263	72272	72280	72288	72296	72304	72313	72321	72329	72337	7	6
529	72346	72354	72362	72370	72378	72387	72395	72403	72411	72419	8	7
530	72428	72436	72444	72452	72460	72469	72477	72485	72493	72501	9	8
531	72509	72518	72526	72534	72542	72550	72558	72567	72575	72583		
532	72591	72599	72607	72616	72624	72632	72640	72648	72656	72665		
533	72673	72681	72689	72697	72705	72713	72722	72730	72738	72746		
534	72754	72762	72770	72779	72787	72795	72803	72811	72819	72827		
535	72835	72843	72852	72860	72868	72876	72884	72892	72900	72908		
536	72916	72925	72933	72941	72949	72957	72965	72973	72981	72989		
537	72997	73006	73014	73022	73030	73038	73046	73054	73062	73070		
538	73078	73086	73094	73102	73111	73119	73127	73135	73143	73151		
539	73159	73167	73175	73183	73191	73199	73207	73215	73223	73231		
540	73239	73247	73255	73263	73272	73280	73288	73296	73304	73312		
541	73320	73328	73336	73344	73352	73360	73368	73376	73384	73392		
542	73400	73408	73416	73424	73432	73440	73448	73456	73464	73472		
543	73480	73488	73496	73504	73512	73520	73528	73536	73544	73552		
544	73560	73568	73576	73584	73592	73600	73608	73616	73624	73632		8
545	73640	73648	73656	73664	73672	73679	73687	73695	73703	73711		
546	73719	73727	73735	73743	73751	73759	73767	73775	73783	73791	1	1
547	73799	73807	73815	73823	73830	73838	73846	73854	73862	73870	2	2
548	73878	73886	73894	73902	73910	73918	73926	73933	73941	73949	3	2
549	73957	73965	73973	73981	73989	73997	74005	74013	74020	74028	4	3
550	74036	74044	74052	74060	74068	74076	74084	74092	74099	74107	5	4
551	74115	74123	74131	74139	74147	74155	74162	74170	74178	74186	6	5
552	74194	74202	74210	74218	74225	74233	74241	74249	74257	74265	7	6
553	74273	74280	74288	74296	74304	74312	74320	74327	74335	74343	8	6
554	74351	74359	74367	74374	74382	74390	74398	74406	74414	74421	9	7
555	74429	74437	74445	74453	74461	74468	74476	74484	74492	74500		
556	74507	74515	74523	74531	74539	74547	74554	74562	74570	74578		
557	74586	74593	74601	74609	74617	74624	74632	74640	74648	74656		
558	74663	74671	74679	74687	74695	74702	74710	74718	74726	74733		
559	74741	74749	74757	74764	74772	74780	74788	74796	74803	74811		
560	74819	74827	74834	74842	74850	74858	74865	74873	74881	74889		
561	74896	74904	74912	74920	74927	74935	74943	74950	74958	74966		
562	74974	74981	74989	74997	75005	75012	75020	75028	75035	75043		
563	75051	75059	75066	75074	75082	75089	75097	75105	75113	75120		
564	75128	75136	75143	75151	75159	75166	75174	75182	75189	75197		
565	75205	75213	75220	75228	75236	75243	75251	75259	75266	75274		
566	75282	75289	75297	75305	75312	75320	75328	75335	75343	75351		
567	75358	75366	75374	75381	75389	75397	75404	75412	75420	75427		
568	75435	75442	75450	75458	75465	75473	75481	75488	75496	75504		
569	75511	75519	75526	75534	75542	75549	75557	75565	75572	75580		7
570	75587	75595	75603	75610	75618	75626	75633	75641	75648	75656		
571	75664	75671	75679	75686	75694	75702	75709	75717	75724	75732	1	1
572	75740	75747	75755	75762	75770	75778	75785	75793	75800	75808	2	1
573	75815	75823	75831	75838	75846	75853	75861	75868	75876	75884	3	2
574	75891	75899	75906	75914	75921	75929	75937	75944	75952	75959	4	3
575	75967	75974	75982	75989	75997	76005	76012	76020	76027	76035	5	4
576	76042	76050	76057	76065	76072	76080	76087	76095	76103	76110	6	4
577	76118	76125	76133	76140	76148	76155	76163	76170	76178	76185	7	5
578	76193	76200	76208	76215	76223	76230	76238	76245	76253	76260	8	6
579	76268	76275	76283	76290	76298	76305	76313	76320	76328	76335	9	6
No.	0	1	2	3	4	5	6	7	8	9		

TABLE 42.

Logarithms of Numbers.

No. 5800——6400. Log. 76343——80618.

No.	0	1	2	3	4	5	6	7	8	9
580	76343	76350	76358	76365	76373	76380	76388	76395	76403	76410
581	76418	76425	76433	76440	76448	76455	76462	76470	76477	76485
582	76492	76500	76507	76515	76522	76530	76537	76545	76552	76559
583	76567	76574	76582	76589	76597	76604	76612	76619	76626	76634
584	76641	76649	76656	76664	76671	76678	76686	76693	76701	76708
585	76716	76723	76730	76738	76745	76753	76760	76768	76775	76782
586	76790	76797	76805	76812	76819	76827	76834	76842	76849	76856
587	76864	76871	76879	76886	76893	76901	76908	76916	76923	76930
588	76938	76945	76953	76960	76967	76975	76982	76989	76997	77004
589	77012	77019	77026	77034	77041	77048	77056	77063	77070	77078
590	77085	77093	77100	77107	77115	77122	77129	77137	77144	77151
591	77159	77166	77173	77181	77188	77195	77203	77210	77217	77225
592	77232	77240	77247	77254	77262	77269	77276	77283	77291	77298
593	77305	77313	77320	77327	77335	77342	77349	77357	77364	77371
594	77379	77386	77393	77401	77408	77415	77422	77430	77437	77444
595	77452	77459	77466	77474	77481	77488	77495	77503	77510	77517
596	77525	77532	77539	77546	77554	77561	77568	77576	77583	77590
597	77597	77605	77612	77619	77627	77634	77641	77648	77656	77663
598	77670	77677	77685	77692	77699	77706	77714	77721	77728	77735
599	77743	77750	77757	77764	77772	77779	77786	77793	77801	77808
600	77815	77822	77830	77837	77844	77851	77859	77866	77873	77880
601	77887	77895	77902	77909	77916	77924	77931	77938	77945	77952
602	77960	77967	77974	77981	77988	77996	78003	78010	78017	78025
603	78032	78039	78046	78053	78061	78068	78075	78082	78089	78097
604	78104	78111	78118	78125	78132	78140	78147	78154	78161	78168
605	78176	78183	78190	78197	78204	78211	78219	78226	78233	78240
606	78247	78254	78262	78269	78276	78283	78290	78297	78305	78312
607	78319	78326	78333	78340	78347	78355	78362	78369	78376	78383
608	78390	78398	78405	78412	78419	78426	78433	78440	78447	78455
609	78462	78469	78476	78483	78490	78497	78504	78512	78519	78526
610	78533	78540	78547	78554	78561	78569	78576	78583	78590	78597
611	78604	78611	78618	78625	78633	78640	78647	78654	78661	78668
612	78675	78682	78689	78696	78704	78711	78718	78725	78732	78739
613	78746	78753	78760	78767	78774	78781	78789	78796	78803	78810
614	78817	78824	78831	78838	78845	78852	78859	78866	78873	78880
615	78888	78895	78902	78909	78916	78923	78930	78937	78944	78951
616	78958	78965	78972	78979	78986	78993	79000	79007	79014	79021
617	79029	79036	79043	79050	79057	79064	79071	79078	79085	79092
618	79099	79106	79113	79120	79127	79134	79141	79148	79155	79162
619	79169	79176	79183	79190	79197	79204	79211	79218	79225	79232
620	79239	79246	79253	79260	79267	79274	79281	79288	79295	79302
621	79309	79316	79323	79330	79337	79344	79351	79358	79365	79372
622	79379	79386	79393	79400	79407	79414	79421	79428	79435	79442
623	79449	79456	79463	79470	79477	79484	79491	79498	79505	79511
624	79518	79525	79532	79539	79546	79553	79560	79567	79574	79581
625	79588	79595	79602	79609	79616	79623	79630	79637	79644	79650
626	79657	79664	79671	79678	79685	79692	79699	79706	79713	79720
627	79727	79734	79741	79748	79754	79761	79768	79775	79782	79789
628	79796	79803	79810	79817	79824	79831	79837	79844	79851	79858
629	79865	79872	79879	79886	79893	79900	79906	79913	79920	79927
630	79934	79941	79948	79955	79962	79969	79975	79982	79989	79996
631	80003	80010	80017	80024	80030	80037	80044	80051	80058	80065
632	80072	80079	80085	80092	80099	80106	80113	80120	80127	80134
633	80140	80147	80154	80161	80168	80175	80182	80188	80195	80202
634	80209	80216	80223	80229	80236	80243	80250	80257	80264	80271
635	80277	80284	80291	80298	80305	80312	80318	80325	80332	80339
636	80346	80353	80359	80366	80373	80380	80387	80393	80400	80407
637	80414	80421	80428	80434	80441	80448	80455	80462	80468	80475
638	80482	80489	80496	80502	80509	80516	80523	80530	80536	80543
639	80550	80557	80564	80570	80577	80584	80591	80598	80604	80611
No.	0	1	2	3	4	5	6	7	8	9

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TABLE 42.

Logarithms of Numbers.

No. 6400——7000. Log. 80618——84510.

No.	0	1	2	3	4	5	6	7	8	9
640	80618	80625	80632	80638	80645	80652	80659	80665	80672	80679
641	80686	80693	80699	80706	80713	80720	80726	80733	80740	80747
642	80754	80760	80767	80774	80781	80787	80794	80801	80808	80814
643	80821	80828	80835	80841	80848	80855	80862	80868	80875	80882
644	80889	80895	80902	80909	80916	80922	80929	80936	80943	80949
645	80956	80963	80969	80976	80983	80990	80996	81003	81010	81017
646	81023	81030	81037	81043	81050	81057	81064	81070	81077	81084
647	81090	81097	81104	81111	81117	81124	81131	81137	81144	81151
648	81158	81164	81171	81178	81184	81191	81198	81204	81211	81218
649	81224	81231	81238	81245	81251	81258	81265	81271	81278	81285
650	81291	81298	81305	81311	81318	81325	81331	81338	81345	81351
651	81358	81365	81371	81378	81385	81391	81398	81405	81411	81418
652	81425	81431	81438	81445	81451	81458	81465	81471	81478	81485
653	81491	81498	81505	81511	81518	81525	81531	81538	81544	81551
654	81558	81564	81571	81578	81584	81591	81598	81604	81611	81617
655	81624	81631	81637	81644	81651	81657	81664	81671	81677	81684
656	81690	81697	81704	81710	81717	81723	81730	81737	81743	81750
657	81757	81763	81770	81776	81783	81790	81796	81803	81809	81816
658	81823	81829	81836	81842	81849	81856	81862	81869	81875	81882
659	81889	81895	81902	81908	81915	81921	81928	81935	81941	81948
660	81954	81961	81968	81974	81981	81987	81994	82000	82007	82014
661	82020	82027	82033	82040	82046	82053	82060	82066	82073	82079
662	82086	82092	82099	82105	82112	82119	82125	82132	82138	82145
663	82151	82158	82164	82171	82178	82184	82191	82197	82204	82210
664	82217	82223	82230	82236	82243	82249	82256	82263	82269	82276
665	82282	82289	82295	82302	82308	82315	82321	82328	82334	82341
666	82347	82354	82360	82367	82373	82380	82387	82393	82400	82406
667	82413	82419	82426	82432	82439	82445	82452	82458	82465	82471
668	82478	82484	82491	82497	82504	82510	82517	82523	82530	82536
669	82543	82549	82556	82562	82569	82575	82582	82588	82595	82601
670	82607	82614	82620	82627	82633	82640	82646	82653	82659	82666
671	82672	82679	82685	82692	82698	82705	82711	82718	82724	82730
672	82737	82743	82750	82756	82763	82769	82776	82782	82789	82795
673	82802	82808	82814	82821	82827	82834	82840	82847	82853	82860
674	82866	82872	82879	82885	82892	82898	82905	82911	82918	82924
675	82930	82937	82943	82950	82956	82963	82969	82975	82982	82988
676	82995	83001	83008	83014	83020	83027	83033	83040	83046	83052
677	83059	83065	83072	83078	83085	83091	83097	83104	83110	83117
678	83123	83129	83136	83142	83149	83155	83161	83168	83174	83181
679	83187	83193	83200	83206	83213	83219	83225	83232	83238	83245
680	83251	83257	83264	83270	83276	83283	83289	83296	83302	83308
681	83315	83321	83327	83334	83340	83347	83353	83359	83366	83372
682	83378	83385	83391	83398	83404	83410	83417	83423	83429	83436
683	83442	83448	83455	83461	83467	83474	83480	83487	83493	83499
684	83506	83512	83518	83525	83531	83537	83544	83550	83556	83563
685	83569	83575	83582	83588	83594	83601	83607	83613	83620	83626
686	83632	83639	83645	83651	83658	83664	83670	83677	83683	83689
687	83696	83702	83708	83715	83721	83727	83734	83740	83746	83753
688	83759	83765	83771	83778	83784	83790	83797	83803	83809	83816
689	83822	83828	83835	83841	83847	83853	83860	83866	83872	83879
690	83885	83891	83897	83904	83910	83916	83923	83929	83935	83942
691	83948	83954	83960	83967	83973	83979	83985	83992	83998	84004
692	84011	84017	84023	84029	84036	84042	84048	84055	84061	84067
693	84073	84080	84086	84092	84098	84105	84111	84117	84123	84130
694	84136	84142	84148	84155	84161	84167	84173	84180	84186	84192
695	84198	84205	84211	84217	84223	84230	84236	84242	84248	84255
696	84261	84267	84273	84280	84286	84292	84298	84305	84311	84317
697	84323	84330	84336	84342	84348	84354	84361	84367	84373	84379
698	84386	84392	84398	84404	84410	84417	84423	84429	84435	84442
699	84448	84454	84460	84466	84473	84479	84485	84491	84497	84504
No.	0	1	2	3	4	5	6	7	8	9

	7
1	1
2	1
3	2
4	3
5	4
6	4
7	5
8	6
9	6

	6
1	1
2	1
3	2
4	2
5	3
6	4
7	4
8	5
9	5

TABLE 42.

Logarithms of Numbers.

No. 7000——7600. Log. 84510——88061.

No.	0	1	2	3	4	5	6	7	8	9		
700	84510	84516	84522	84528	84535	84541	84547	84553	84559	84566		7
701	84572	84578	84584	84590	84597	84603	84609	84615	84621	84628		
702	84634	84640	84646	84652	84658	84665	84671	84677	84683	84689	1	1
703	84696	84702	84708	84714	84720	84726	84733	84739	84745	84751	2	1
704	84757	84763	84770	84776	84782	84788	84794	84800	84807	84813	3	2
705	84819	84825	84831	84837	84844	84850	84856	84862	84868	84874	4	3
706	84880	84887	84893	84899	84905	84911	84917	84924	84930	84936	5	4
707	84942	84948	84954	84960	84967	84973	84979	84985	84991	84997	6	4
708	85003	85009	85016	85022	85028	85034	85040	85046	85052	85058	7	5
709	85065	85071	85077	85083	85089	85095	85101	85107	85114	85120	8	6
710	85126	85132	85138	85144	85150	85156	85163	85169	85175	85181	9	6
711	85187	85193	85199	85205	85211	85217	85224	85230	85236	85242		
712	85248	85254	85260	85266	85272	85278	85285	85291	85297	85303		
713	85309	85315	85321	85327	85333	85339	85345	85352	85358	85364		
714	85370	85376	85382	85388	85394	85400	85406	85412	85418	85425		
715	85431	85437	85443	85449	85455	85461	85467	85473	85479	85485		
716	85491	85497	85503	85509	85516	85522	85528	85534	85540	85546		
717	85552	85558	85564	85570	85576	85582	85588	85594	85600	85606		
718	85612	85618	85625	85631	85637	85643	85649	85655	85661	85667		
719	85673	85679	85685	85691	85697	85703	85709	85715	85721	85727		
720	85733	85739	85745	85751	85757	85763	85769	85775	85781	85788		
721	85794	85800	85806	85812	85818	85824	85830	85836	85842	85848		
722	85854	85860	85866	85872	85878	85884	85890	85896	85902	85908		
723	85914	85920	85926	85932	85938	85944	85950	85956	85962	85968		
724	85974	85980	85986	85992	85998	86004	86010	86016	86022	86028		
725	86034	86040	86046	86052	86058	86064	86070	86076	86082	86088		6
726	86094	86100	86106	86112	86118	86124	86130	86136	86141	86147		
727	86153	86159	86165	86171	86177	86183	86189	86195	86201	86207	1	1
728	86213	86219	86225	86231	86237	86243	86249	86255	86261	86267	2	1
729	86273	86279	86285	86291	86297	86303	86308	86314	86320	86326	3	2
730	86332	86338	86344	86350	86356	86362	86368	86374	86380	86386	4	2
731	86392	86398	86404	86410	86415	86421	86427	86433	86439	86445	5	3
732	86451	86457	86463	86469	86475	86481	86487	86493	86499	86504	6	4
733	86510	86516	86522	86528	86534	86540	86546	86552	86558	86564	7	4
734	86570	86576	86581	86587	86593	86599	86605	86611	86617	86623	8	5
735	86629	86635	86641	86646	86652	86658	86664	86670	86676	86682	9	5
736	86688	86694	86700	86705	86711	86717	86723	86729	86735	86741		
737	86747	86753	86759	86764	86770	86776	86782	86788	86794	86800		
738	86806	86812	86817	86823	86829	86835	86841	86847	86853	86859		
739	86864	86870	86876	86882	86888	86894	86900	86906	86911	86917		
740	86923	86929	86935	86941	86947	86953	86958	86964	86970	86976		
741	86982	86988	86994	86999	87005	87011	87017	87023	87029	87035		
742	87040	87046	87052	87058	87064	87070	87075	87081	87087	87093		
743	87099	87105	87111	87116	87122	87128	87134	87140	87146	87151		
744	87157	87163	87169	87175	87181	87186	87192	87198	87204	87210		
745	87216	87221	87227	87233	87239	87245	87251	87256	87262	87268		
746	87274	87280	87286	87291	87297	87303	87309	87315	87320	87326		
747	87332	87338	87344	87349	87355	87361	87367	87373	87379	87384		
748	87390	87396	87402	87408	87413	87419	87425	87431	87437	87442		
749	87448	87454	87460	87466	87471	87477	87483	87489	87495	87500		5
750	87506	87512	87518	87523	87529	87535	87541	87547	87552	87558		
751	87564	87570	87576	87581	87587	87593	87599	87604	87610	87616	1	1
752	87622	87628	87633	87639	87645	87651	87656	87662	87668	87674	2	1
753	87679	87685	87691	87697	87703	87708	87714	87720	87726	87731	3	2
754	87737	87743	87749	87754	87760	87766	87772	87777	87783	87789	4	2
755	87795	87800	87806	87812	87818	87823	87829	87835	87841	87846	5	3
756	87852	87858	87864	87869	87875	87881	87887	87892	87898	87904	6	3
757	87910	87915	87921	87927	87933	87938	87944	87950	87955	87961	7	4
758	87967	87973	87978	87984	87990	87996	88001	88007	88013	88018	8	4
759	88024	88030	88036	88041	88047	88053	88058	88064	88070	88076	9	5
No.	0	1	2	3	4	5	6	7	8	9		

TABLE 42.

Logarithms of Numbers.

No. 7600——8200. Log. 88081——91381.

No.	0	1	2	3	4	5	6	7	8	9		
760	88081	88087	88093	88098	88104	88110	88116	88121	88127	88133		6
761	88138	88144	88150	88156	88161	88167	88173	88178	88184	88190		
762	88195	88201	88207	88213	88218	88224	88230	88235	88241	88247	1	1
763	88252	88258	88264	88270	88275	88281	88287	88292	88298	88304	2	1
764	88309	88315	88321	88326	88332	88338	88343	88349	88355	88360	3	2
765	88366	88372	88377	88383	88389	88395	88400	88406	88412	88417	4	2
766	88423	88429	88434	88440	88446	88451	88457	88463	88468	88474	5	3
767	88480	88485	88491	88497	88502	88508	88513	88519	88525	88530	6	4
768	88536	88542	88547	88553	88559	88564	88570	88576	88581	88587	7	4
769	88593	88598	88604	88610	88615	88621	88627	88632	88638	88643	8	5
770	88649	88655	88660	88666	88672	88677	88683	88689	88694	88700	9	5
771	88705	88711	88717	88722	88728	88734	88739	88745	88750	88756		
772	88762	88767	88773	88779	88784	88790	88795	88801	88807	88812		
773	88818	88824	88829	88835	88840	88846	88852	88857	88863	88868		
774	88874	88880	88885	88891	88897	88902	88908	88913	88919	88925		
775	88930	88936	88941	88947	88953	88958	88964	88969	88975	88981		
776	88986	88992	88997	89003	89009	89014	89020	89025	89031	89037		
777	89042	89048	89053	89059	89064	89070	89076	89081	89087	89092		
778	89098	89104	89109	89115	89120	89126	89131	89137	89143	89148		
779	89154	89159	89165	89170	89176	89182	89187	89193	89198	89204		
780	89209	89215	89221	89226	89232	89237	89243	89248	89254	89260		
781	89265	89271	89276	89282	89287	89293	89298	89304	89310	89315		
782	89321	89326	89332	89337	89343	89348	89354	89360	89365	89371		
783	89376	89382	89387	89393	89398	89404	89409	89415	89421	89426		
784	89432	89437	89443	89448	89454	89459	89465	89470	89476	89481		
785	89487	89492	89498	89504	89509	89515	89520	89526	89531	89537		
786	89542	89548	89553	89559	89564	89570	89575	89581	89586	89592		
787	89597	89603	89609	89614	89620	89625	89631	89636	89642	89647		
788	89653	89658	89664	89669	89675	89680	89686	89691	89697	89702		
789	89708	89713	89719	89724	89730	89735	89741	89746	89752	89757		
790	89763	89768	89774	89779	89785	89790	89796	89801	89807	89812		
791	89818	89823	89829	89834	89840	89845	89851	89856	89862	89867		
792	89873	89878	89883	89889	89894	89900	89905	89911	89916	89922		
793	89927	89933	89938	89944	89949	89955	89960	89966	89971	89977		
794	89982	89988	89993	89998	90004	90009	90015	90020	90026	90031		
795	90037	90042	90048	90053	90059	90064	90069	90075	90080	90086		
796	90091	90097	90102	90108	90113	90119	90124	90129	90135	90140		
797	90146	90151	90157	90162	90168	90173	90179	90184	90189	90195		
798	90200	90206	90211	90217	90222	90227	90233	90238	90244	90249		
799	90255	90260	90266	90271	90276	90282	90287	90293	90298	90304		
800	90309	90314	90320	90325	90331	90336	90342	90347	90352	90358		
801	90363	90369	90374	90380	90385	90390	90396	90401	90407	90412		
802	90417	90423	90428	90434	90439	90445	90450	90455	90461	90466		
803	90472	90477	90482	90488	90493	90499	90504	90509	90515	90520		
804	90526	90531	90536	90542	90547	90553	90558	90563	90569	90574		
805	90580	90585	90590	90596	90601	90607	90612	90617	90623	90628		
806	90634	90639	90644	90650	90655	90660	90666	90671	90677	90682		
807	90687	90693	90698	90703	90709	90714	90720	90725	90730	90736		
808	90741	90747	90752	90757	90763	90768	90773	90779	90784	90789		
809	90795	90800	90806	90811	90816	90822	90827	90832	90838	90843		5
810	90849	90854	90859	90865	90870	90875	90881	90886	90891	90897		
811	90902	90907	90913	90918	90924	90929	90934	90940	90945	90950	1	1
812	90956	90961	90966	90972	90977	90982	90988	90993	90998	91004	2	1
813	91009	91014	91020	91025	91030	91036	91041	91046	91052	91057	3	2
814	91062	91068	91073	91078	91084	91089	91094	91100	91105	91110	4	2
815	91116	91121	91126	91132	91137	91142	91148	91153	91158	91164	5	3
816	91169	91174	91180	91185	91190	91196	91201	91206	91212	91217	6	3
817	91222	91228	91233	91238	91243	91249	91254	91259	91265	91270	7	4
818	91275	91281	91286	91291	91297	91302	91307	91312	91318	91323	8	4
819	91328	91334	91339	91344	91350	91355	91360	91365	91371	91376	9	5
No.	0	1	2	3	4	5	6	7	8	9		

TABLE 42.

Logarithms of Numbers.

No. 8200——8800. Log. 91381——94448

No.	0	1	2	3	4	5	6	7	8	9
820	91381	91387	91392	91397	91403	91408	91413	91418	91424	91429
821	91434	91440	91445	91450	91455	91461	91466	91471	91477	91482
822	91487	91492	91498	91503	91508	91514	91519	91524	91529	91535
823	91540	91545	91551	91556	91561	91566	91572	91577	91582	91587
824	91593	91598	91603	91609	91614	91619	91624	91630	91635	91640
825	91645	91651	91656	91661	91666	91672	91677	91682	91687	91693
826	91698	91703	91709	91714	91719	91724	91730	91735	91740	91745
827	91751	91756	91761	91766	91772	91777	91782	91787	91793	91798
828	91803	91808	91814	91819	91824	91829	91834	91840	91845	91850
829	91855	91861	91866	91871	91876	91882	91887	91892	91897	91903
830	91908	91913	91918	91924	91929	91934	91939	91944	91950	91955
831	91960	91965	91971	91976	91981	91986	91991	91997	92002	92007
832	92012	92018	92023	92028	92033	92038	92044	92049	92054	92059
833	92065	92070	92075	92080	92085	92091	92096	92101	92106	92111
834	92117	92122	92127	92132	92137	92143	92148	92153	92158	92163
835	92169	92174	92179	92184	92189	92195	92200	92205	92210	92215
836	92221	92226	92231	92236	92241	92247	92252	92257	92262	92267
837	92273	92278	92283	92288	92293	92298	92304	92309	92314	92319
838	92324	92330	92335	92340	92345	92350	92355	92361	92366	92371
839	92376	92381	92387	92392	92397	92402	92407	92412	92418	92423
840	92428	92433	92438	92443	92449	92454	92459	92464	92469	92474
841	92480	92485	92490	92495	92500	92505	92511	92516	92521	92526
842	92531	92536	92542	92547	92552	92557	92562	92567	92572	92578
843	92583	92588	92593	92598	92603	92609	92614	92619	92624	92629
844	92634	92639	92645	92650	92655	92660	92665	92670	92675	92681
845	92686	92691	92696	92701	92706	92711	92716	92722	92727	92732
846	92737	92742	92747	92752	92758	92763	92768	92773	92778	92783
847	92788	92793	92799	92804	92809	92814	92819	92824	92829	92834
848	92840	92845	92850	92855	92860	92865	92870	92875	92881	92886
849	92891	92896	92901	92906	92911	92916	92921	92927	92932	92937
850	92942	92947	92952	92957	92962	92967	92973	92978	92983	92988
851	92993	92998	93003	93008	93013	93018	93024	93029	93034	93039
852	93044	93049	93054	93059	93064	93069	93075	93080	93085	93090
853	93095	93100	93105	93110	93115	93120	93125	93131	93136	93141
854	93146	93151	93156	93161	93166	93171	93176	93181	93186	93192
855	93197	93202	93207	93212	93217	93222	93227	93232	93237	93242
856	93247	93252	93258	93263	93268	93273	93278	93283	93288	93293
857	93298	93303	93308	93313	93318	93323	93328	93334	93339	93344
858	93349	93354	93359	93364	93369	93374	93379	93384	93389	93394
859	93399	93404	93409	93414	93420	93425	93430	93435	93440	93445
860	93450	93455	93460	93465	93470	93475	93480	93485	93490	93495
861	93500	93505	93510	93515	93520	93526	93531	93536	93541	93546
862	93551	93556	93561	93566	93571	93576	93581	93586	93591	93596
863	93601	93606	93611	93616	93621	93626	93631	93636	93641	93646
864	93651	93656	93661	93666	93671	93676	93682	93687	93692	93697
865	93702	93707	93712	93717	93722	93727	93732	93737	93742	93747
866	93752	93757	93762	93767	93772	93777	93782	93787	93792	93797
867	93802	93807	93812	93817	93822	93827	93832	93837	93842	93847
868	93852	93857	93862	93867	93872	93877	93882	93887	93892	93897
869	93902	93907	93912	93917	93922	93927	93932	93937	93942	93947
870	93952	93957	93962	93967	93972	93977	93982	93987	93992	93997
871	94002	94007	94012	94017	94022	94027	94032	94037	94042	94047
872	94052	94057	94062	94067	94072	94077	94082	94086	94091	94096
873	94101	94106	94111	94116	94121	94126	94131	94136	94141	94146
874	94151	94156	94161	94166	94171	94176	94181	94186	94191	94196
875	94201	94206	94211	94216	94221	94226	94231	94236	94240	94245
876	94250	94255	94260	94265	94270	94275	94280	94285	94290	94295
877	94300	94305	94310	94315	94320	94325	94330	94335	94340	94345
878	94349	94354	94359	94364	94369	94374	94379	94384	94389	94394
879	94399	94404	94409	94414	94419	94424	94429	94433	94438	94443
No.	0	1	2	3	4	5	6	7	8	9

	6
1	1
2	1
3	2
4	2
5	3
6	4
7	4
8	5
9	5

	5
1	1
2	1
3	2
4	2
5	3
6	3
7	4
8	4
9	5

	4
1	0
2	1
3	1
4	2
5	2
6	2
7	3
8	3
9	4

TABLE 42.

Logarithms of Numbers.

No. 8800——9400.

Log. 94448——97313.

No.	0	1	2	3	4	5	6	7	8	9
880	94448	94453	94458	94463	94468	94473	94478	94483	94488	94493
881	94498	94503	94507	94512	94517	94522	94527	94532	94537	94542
882	94547	94552	94557	94562	94567	94571	94576	94581	94586	94591
883	94596	94601	94606	94611	94616	94621	94626	94630	94635	94640
884	94645	94650	94655	94660	94665	94670	94675	94680	94685	94689
885	94694	94699	94704	94709	94714	94719	94724	94729	94734	94738
886	94743	94748	94753	94758	94763	94768	94773	94778	94783	94787
887	94792	94797	94802	94807	94812	94817	94822	94827	94832	94836
888	94841	94846	94851	94856	94861	94866	94871	94876	94880	94885
889	94890	94895	94900	94905	94910	94915	94919	94924	94929	94934
890	94939	94944	94949	94954	94959	94963	94968	94973	94978	94983
891	94988	94993	94998	95002	95007	95012	95017	95022	95027	95032
892	95036	95041	95046	95051	95056	95061	95066	95071	95075	95080
893	95085	95090	95095	95100	95105	95109	95114	95119	95124	95129
894	95134	95139	95143	95148	95153	95158	95163	95168	95173	95177
895	95182	95187	95192	95197	95202	95207	95211	95216	95221	95226
896	95231	95236	95240	95245	95250	95255	95260	95265	95270	95274
897	95279	95284	95289	95294	95299	95303	95308	95313	95318	95323
898	95328	95332	95337	95342	95347	95352	95357	95361	95366	95371
899	95376	95381	95386	95390	95395	95400	95405	95410	95415	95419
900	95424	95429	95434	95439	95444	95448	95453	95458	95463	95468
901	95472	95477	95482	95487	95492	95497	95501	95506	95511	95516
902	95521	95525	95530	95535	95540	95545	95550	95554	95559	95564
903	95569	95574	95578	95583	95588	95593	95598	95602	95607	95612
904	95617	95622	95626	95631	95636	95641	95646	95650	95655	95660
905	95665	95670	95674	95679	95684	95689	95694	95698	95703	95708
906	95713	95718	95722	95727	95732	95737	95742	95746	95751	95756
907	95761	95766	95770	95775	95780	95785	95789	95794	95799	95804
908	95809	95813	95818	95823	95828	95832	95837	95842	95847	95852
909	95856	95861	95866	95871	95875	95880	95885	95890	95895	95899
910	95904	95909	95914	95918	95923	95928	95933	95938	95942	95947
911	95952	95957	95961	95966	95971	95976	95980	95985	95990	95995
912	95999	96004	96009	96014	96019	96023	96028	96033	96038	96042
913	96047	96052	96057	96061	96066	96071	96076	96080	96085	96090
914	96095	96099	96104	96109	96114	96118	96123	96128	96133	96137
915	96142	96147	96152	96156	96161	96166	96171	96175	96180	96185
916	96190	96194	96199	96204	96209	96213	96218	96223	96227	96232
917	96237	96242	96246	96251	96256	96261	96265	96270	96275	96280
918	96284	96289	96294	96298	96303	96308	96313	96317	96322	96327
919	96332	96336	96341	96346	96350	96355	96360	96365	96369	96374
920	96379	96384	96388	96393	96398	96402	96407	96412	96417	96421
921	96426	96431	96435	96440	96445	96450	96454	96459	96464	96468
922	96473	96478	96483	96487	96492	96497	96501	96506	96511	96515
923	96520	96525	96530	96534	96539	96544	96548	96553	96558	96562
924	96567	96572	96577	96581	96586	96591	96595	96600	96605	96609
925	96614	96619	96624	96628	96633	96638	96642	96647	96652	96656
926	96661	96666	96670	96675	96680	96685	96689	96694	96699	96703
927	96708	96713	96717	96722	96727	96731	96736	96741	96745	96750
928	96755	96759	96764	96769	96774	96778	96783	96788	96792	96797
929	96802	96806	96811	96816	96820	96825	96830	96834	96839	96844
930	96848	96853	96858	96862	96867	96872	96876	96881	96886	96890
931	96895	96900	96904	96909	96914	96918	96923	96928	96932	96937
932	96942	96946	96951	96956	96960	96965	96970	96974	96979	96984
933	96988	96993	96997	97002	97007	97011	97016	97021	97025	97030
934	97035	97039	97044	97049	97053	97058	97063	97067	97072	97077
935	97081	97086	97090	97095	97100	97104	97109	97114	97118	97123
936	97128	97132	97137	97142	97146	97151	97155	97160	97165	97169
937	97174	97179	97183	97188	97192	97197	97202	97206	97211	97216
938	97220	97225	97230	97234	97239	97243	97248	97253	97257	97262
939	97267	97271	97276	97280	97285	97290	97294	97299	97304	97308
No.	0	1	2	3	4	5	6	7	8	9

	5
1	1
2	1
3	2
4	2
5	3
6	3
7	4
8	4
9	5

	4
1	0
2	1
3	1
4	2
5	2
6	2
7	3
8	3
9	4

TABLE 42.

Logarithms of Numbers.

No. 9400——10000. Log. 97313——99996.

No.	0	1	2	3	4	5	6	7	8	9		
940	97313	97317	97322	97327	97331	97336	97340	97345	97350	97354		5
941	97359	97364	97368	97373	97377	97382	97387	97391	97396	97400		
942	97405	97410	97414	97419	97424	97428	97433	97437	97442	97447	1	1
943	97451	97456	97460	97465	97470	97474	97479	97483	97488	97493	2	1
944	97497	97502	97506	97511	97516	97520	97525	97529	97534	97539	3	2
945	97543	97548	97552	97557	97562	97566	97571	97575	97580	97585	4	2
946	97589	97594	97598	97603	97607	97612	97617	97621	97626	97630	5	3
947	97635	97640	97644	97649	97653	97658	97663	97667	97672	97676	6	3
948	97681	97685	97690	97695	97699	97704	97708	97713	97717	97722	7	4
949	97727	97731	97736	97740	97745	97749	97754	97759	97763	97768	8	4
950	97772	97777	97782	97786	97791	97795	97800	97804	97809	97813	9	5
951	97818	97823	97827	97832	97836	97841	97845	97850	97855	97859		
952	97864	97868	97873	97877	97882	97886	97891	97896	97900	97905		
953	97909	97914	97918	97923	97928	97932	97937	97941	97946	97950		
954	97955	97959	97964	97968	97973	97978	97982	97987	97991	97996		
955	98000	98005	98009	98014	98019	98023	98028	98032	98037	98041		
956	98046	98050	98055	98059	98064	98068	98073	98078	98082	98087		
957	98091	98096	98100	98105	98109	98114	98118	98123	98127	98132		
958	98137	98141	98146	98150	98155	98159	98164	98168	98173	98177		
959	98182	98186	98191	98195	98200	98204	98209	98214	98218	98223		
960	98227	98232	98236	98241	98245	98250	98254	98259	98263	98268		
961	98272	98277	98281	98286	98290	98295	98299	98304	98308	98313		
962	98318	98322	98327	98331	98336	98340	98345	98349	98354	98358		
963	98363	98367	98372	98376	98381	98385	98390	98394	98399	98403		
964	98408	98412	98417	98421	98426	98430	98435	98439	98444	98448		
965	98453	98457	98462	98466	98471	98475	98480	98484	98489	98493		
966	98498	98502	98507	98511	98516	98520	98525	98529	98534	98538		
967	98543	98547	98552	98556	98561	98565	98570	98574	98579	98583		
968	98588	98592	98597	98601	98605	98610	98614	98619	98623	98628		
969	98632	98637	98641	98646	98650	98655	98659	98664	98668	98673		
970	98677	98682	98686	98691	98695	98700	98704	98709	98713	98717		
971	98722	98726	98731	98735	98740	98744	98749	98753	98758	98762		
972	98767	98771	98776	98780	98784	98789	98793	98798	98802	98807		
973	98811	98816	98820	98825	98829	98834	98838	98843	98847	98851		
974	98856	98860	98865	98869	98874	98878	98883	98887	98892	98896		
975	98900	98905	98909	98914	98918	98923	98927	98932	98936	98941		
976	98945	98949	98954	98958	98963	98967	98972	98976	98981	98985		
977	98989	98994	98998	99003	99007	99012	99016	99021	99025	99029		
978	99034	99038	99043	99047	99052	99056	99061	99065	99069	99074		
979	99078	99083	99087	99092	99096	99100	99105	99109	99114	99118		
980	99123	99127	99131	99136	99140	99145	99149	99154	99158	99162		
981	99167	99171	99176	99180	99185	99189	99193	99198	99202	99207		
982	99211	99216	99220	99224	99229	99233	99238	99242	99247	99251		
983	99255	99260	99264	99269	99273	99277	99282	99286	99291	99295		
984	99300	99304	99308	99313	99317	99322	99326	99330	99335	99339		
985	99344	99348	99352	99357	99361	99366	99370	99374	99379	99383		
986	99388	99392	99396	99401	99405	99410	99414	99419	99423	99427		
987	99432	99436	99441	99445	99449	99454	99458	99463	99467	99471		
988	99476	99480	99484	99489	99493	99498	99502	99506	99511	99515		
989	99520	99524	99528	99533	99537	99542	99546	99550	99555	99559		4
990	99564	99568	99572	99577	99581	99585	99590	99594	99599	99603		
991	99607	99612	99616	99621	99625	99629	99634	99638	99642	99647	1	0
992	99651	99656	99660	99664	99669	99673	99677	99682	99686	99691	2	1
993	99695	99699	99704	99708	99712	99717	99721	99726	99730	99734	3	1
994	99739	99743	99747	99752	99756	99760	99765	99769	99774	99778	4	2
995	99782	99787	99791	99795	99800	99804	99808	99813	99817	99822	5	2
996	99826	99830	99835	99839	99843	99848	99852	99856	99861	99865	6	2
997	99870	99874	99878	99883	99887	99891	99896	99900	99904	99909	7	3
998	99913	99917	99922	99926	99930	99935	99939	99944	99948	99952	8	3
999	99957	99961	99965	99970	99974	99978	99983	99987	99991	99996	9	4
No.	0	1	2	3	4	5	6	7	8	9		

TABLE 43.

Logarithmic Sines, Tangents, and Secants to every Point and Quarter Point of the Compass.

Points.	Sine.	Cosine.	Tangent.	Cotangent.	Secant.	Cosecant.	
0	Inf. neg.	10.00000	Inf. neg.	Infinite.	10.00000	Infinite.	8
¼	8.69080	9.99948	8.69132	11.30868	10.00052	11.30920	7¾
½	8.99130	9.99790	8.99340	11.00660	10.00210	11.00870	7½
¾	9.16652	9.99527	9.17125	10.82875	10.00473	10.83348	7¼
1	9.29024	9.99157	9.29866	10.70134	10.00843	10.70976	7
1¼	9.38557	9.98679	9.39879	10.60121	10.01321	10.61443	6¾
1½	9.46282	9.98088	9.48194	10.51806	10.01912	10.53718	6½
1¾	9.52749	9.97384	9.55365	10.44635	10.02616	10.47251	6¼
2	9.58284	9.96562	9.61722	10.38278	10.03438	10.41716	6
2¼	9.63099	9.95616	9.67483	10.32517	10.04384	10.36901	5¾
2½	9.67339	9.94543	9.72796	10.27204	10.05457	10.32661	5½
2¾	9.71105	9.93335	9.77770	10.22230	10.06665	10.28895	5¼
3	9.74474	9.91985	9.82489	10.17511	10.08015	10.25526	5
3¼	9.77503	9.90483	9.87020	10.12980	10.09517	10.22497	4¾
3½	9.80236	9.88819	9.91417	10.08583	10.11181	10.19764	4½
3¾	9.82708	9.86979	9.95729	10.04271	10.13021	10.17292	4¼
4	9.84949	9.84949	10.00000	10.00000	10.15051	10.15051	4
	Cosine.	Sine.	Cotangent.	Tangent.	Cosecant.	Secant.	Points.

TABLE 44.

Log. Sines, Tangents, and Secants.

0° 179°

M.	Hour A. M.	Hour P. M.	Sine.	Diff. 1′.	Cosecant.	Tangent.	Diff. 1′.	Cotangent.	Secant.	Cosine.	M.
0	12 0 0	0 0 0	Inf. neg.		Infinite.	Inf. neg.		Infinite.	10. 00000	10. 00000	60
1	11 59 52	0 8	6. 46373	30103	13. 53627	6. 46373	30103	13. 53627	00000	00000	59
2	59 44	0 16	76476	17609	23524	76476	17609	23524	00000	00000	58
3	59 36	0 24	94085	12494	05915	94085	12494	05915	00000	00000	57
4	59 28	0 32	7. 06579	9691	12. 93421	7. 06579	9691	12. 93421	00000	00000	56
5	11 59 20	0 0 40	7. 16270	7918	12. 83730	7. 16270	7918	12. 83730	10. 00000	10. 00000	55
6	59 12	0 48	24188	6694	75812	24188	6694	75812	00000	00000	54
7	59 4	0 56	30882	5800	69118	30882	5800	69118	00000	00000	53
8	58 56	1 4	36682	5115	63318	36682	5115	63318	00000	00000	52
9	58 48	1 12	41797	4576	58203	41797	4576	58203	00000	00000	51
10	11 58 40	0 1 20	7. 46373	4139	12. 53627	7. 46373	4139	12. 53627	10. 00000	10. 00000	50
11	58 32	1 28	50512	3779	49488	50512	3779	49488	00000	00000	49
12	58 24	1 36	54291	3476	45709	54291	3476	45709	00000	00000	48
13	58 16	1 44	57767	3218	42233	57767	3219	42233	00000	00000	47
14	58 8	1 52	60985	2997	39015	60986	2996	39014	00000	00000	46
15	11 58 0	0 2 0	7. 63982	2802	12. 36018	7. 63982	2803	12. 36018	10. 00000	10. 00000	45
16	57 52	2 8	66784	2633	33216	66785	2633	33215	00000	00000	44
17	57 44	2 16	69417	2483	30583	69418	2482	30582	00001	9. 99999	43
18	57 36	2 24	71900	2348	28100	71900	2348	28100	00001	99999	42
19	57 28	2 32	74248	2227	25752	74248	2228	25752	00001	99999	41
20	11 57 20	0 2 40	7. 76475	2119	12. 23525	7. 76476	2119	12. 23524	10. 00001	9. 99999	40
21	57 12	2 48	78594	2021	21406	78595	2020	21405	00001	99999	39
22	57 4	2 56	80615	1930	19385	80615	1931	19385	00001	99999	38
23	56 56	3 4	82545	1848	17455	82546	1848	17454	00001	99999	37
24	56 48	3 12	84393	1773	15607	84394	1773	15606	00001	99999	36
25	11 56 40	0 3 20	7. 86166	1704	12. 13834	7. 86167	1704	12. 13833	10. 00001	9. 99999	35
26	56 32	3 28	87870	1639	12130	87871	1639	12129	00001	99999	34
27	56 24	3 36	89509	1579	10491	89510	1579	10490	00001	99999	33
28	56 16	3 44	91088	1524	08912	91089	1524	08911	00001	99999	32
29	56 8	3 52	92612	1472	07388	92613	1473	07387	00002	99998	31
30	11 56 0	0 4 0	7. 94084	1424	12. 05916	7. 94086	1424	12. 05914	10. 00002	9. 99998	30
31	55 52	4 8	95508	1379	04492	95510	1379	04490	00002	99998	29
32	55 44	4 16	96887	1336	03113	96889	1336	03111	00002	99998	28
33	55 36	4 24	98223	1297	01777	98225	1297	01775	00002	99998	27
34	55 28	4 32	99520	1259	00480	99522	1259	00478	00002	99998	26
35	11 55 20	0 4 40	8. 00779	1223	11. 99221	8. 00781	1223	11. 99219	10. 00002	9. 99998	25
36	55 12	4 48	02002	1190	97998	02004	1190	97996	00002	99998	24
37	55 4	4 56	03192	1158	96808	03194	1159	96806	00003	99997	23
38	54 56	5 4	04350	1128	95650	04353	1128	95647	00003	99997	22
39	54 48	5 12	05478	1100	94522	05481	1100	94519	00003	99997	21
40	11 54 40	0 5 20	8. 06578	1072	11. 93422	8. 06581	1072	11. 93419	10. 00003	9. 99997	20
41	54 32	5 28	07650	1046	92350	07653	1047	92347	00003	99997	19
42	54 24	5 36	08696	1022	91304	08700	1022	91300	00003	99997	18
43	54 16	5 44	09718	999	90282	09722	998	90278	00003	99997	17
44	54 8	5 52	10717	976	89283	10720	976	89280	00004	99996	16
45	11 54 0	0 6 0	8. 11693	954	11. 88307	8. 11696	955	11. 88304	10. 00004	9. 99996	15
46	53 52	6 8	12647	934	87353	12651	934	87349	00004	99996	14
47	53 44	6 16	13581	914	86419	13585	915	86415	00004	99996	13
48	53 36	6 24	14495	896	85505	14500	895	85500	00004	99996	12
49	53 28	6 32	15391	877	84609	15395	878	84605	00004	99996	11
50	11 53 20	0 6 40	8. 16268	860	11. 83732	8. 16273	860	11. 83727	10. 00005	9. 99995	10
51	53 12	6 48	17128	843	82872	17133	843	82867	00005	99995	9
52	53 4	6 56	17971	827	82029	17976	828	82024	00005	99995	8
53	52 56	7 4	18798	812	81202	18804	812	81196	00005	99995	7
54	52 48	7 12	19610	797	80390	19616	797	80384	00005	99995	6
55	11 52 40	0 7 20	8. 20407	782	11. 79593	8. 20413	782	11. 79587	10. 00006	9. 99994	5
56	52 32	7 28	21189	769	78811	21195	769	78805	00006	99994	4
57	52 24	7 36	21958	755	78042	21964	756	78036	00006	99994	3
58	52 16	7 44	22713	743	77287	22720	742	77280	00006	99994	2
59	52 8	7 52	23456	730	76544	23462	730	76538	00006	99994	1
60	52 0	8 0	24186	717	75814	24192	718	75808	00007	99993	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff. 1′.	Secant.	Cotangent.	Diff. 1′.	Tangent.	Cosecant.	Sine.	M.

90° 89°

TABLE 44.

Log. Sines, Tangents, and Secants.

1° 178°

M.	Hour A. M.	Hour P. M.	Sine.	Diff. 1′.	Cosecant.	Tangent.	Diff. 1′.	Cotangent.	Secant.	Cosine.	M.
0	11 52 0	0 8 0	8.24186	717	11.75814	8.24192	718	11.75808	10.00007	9.99993	60
1	51 52	8 8	24903	706	75097	24910	706	75090	00007	99993	59
2	51 44	8 16	25609	695	74391	25616	696	74384	00007	99993	58
3	51 36	8 24	26304	684	73696	26312	684	73688	00007	99993	57
4	51 28	8 32	26988	673	73012	26996	673	73004	00008	99992	56
5	11 51 20	0 8 40	8.27661	663	11.72339	8.27669	663	11.72331	10.00008	9.99992	55
6	51 12	8 48	28324	653	71676	28332	654	71668	00008	99992	54
7	51 4	8 56	28977	644	71023	28986	643	71014	00008	99992	53
8	50 56	9 4	29621	634	70379	29629	634	70371	00008	99992	52
9	50 48	9 12	30255	624	69745	30263	625	69737	00009	99991	51
10	11 50 40	0 9 20	8.30879	616	11.69121	8.30888	617	11.69112	10.00009	9.99991	50
11	50 32	9 28	31495	608	68505	31505	607	68495	00009	99991	49
12	50 24	9 36	32103	599	67897	32112	599	67888	00010	99990	48
13	50 16	9 44	32702	590	67298	32711	591	67289	00010	99990	47
14	50 8	9 52	33292	583	66708	33302	584	66698	00010	99990	46
15	11 50 0	0 10 0	8.33875	575	11.66125	8.33886	575	11.66114	10.00010	9.99990	45
16	49 52	10 8	34450	568	65550	34461	568	65539	00011	99989	44
17	49 44	10 16	35018	560	64982	35029	561	64971	00011	99989	43
18	49 36	10 24	35578	553	64422	35590	553	64410	00011	99989	42
19	49 28	10 32	36131	547	63869	36143	546	63857	00011	99989	41
20	11 49 20	0 10 40	8.36678	539	11.63322	8.36689	540	11.63311	10.00012	9.99988	40
21	49 12	10 48	37217	533	62783	37229	533	62771	00012	99988	39
22	49 4	10 56	37750	526	62250	37762	527	62238	00012	99988	38
23	48 56	11 4	38276	520	61724	38289	520	61711	00013	99987	37
24	48 48	11 12	38796	514	61204	38809	514	61191	00013	99987	36
25	11 48 40	0 11 20	8.39310	508	11.60690	8.39323	509	11.60677	10.00013	9.99987	35
26	48 32	11 28	39818	502	60182	39832	502	60168	00014	99986	34
27	48 24	11 36	40320	496	59680	40334	496	59666	00014	99986	33
28	48 16	11 44	40816	491	59184	40830	491	59170	00014	99986	32
29	48 8	11 52	41307	485	58693	41321	486	58679	00015	99985	31
30	11 48 0	0 12 0	8.41792	480	11.58208	8.41807	480	11.58193	10.00015	9.99985	30
31	47 52	12 8	42272	474	57728	42287	475	57713	00015	99985	29
32	47 44	12 16	42746	470	57254	42762	470	57238	00016	99984	28
33	47 36	12 24	43216	464	56784	43232	464	56768	00016	99984	27
34	47 28	12 32	43680	459	56320	43696	460	56304	00016	99984	26
35	11 47 20	0 12 40	8.44139	455	11.55861	8.44156	455	11.55844	10.00017	9.99983	25
36	47 12	12 48	44594	450	55406	44611	450	55389	00017	99983	24
37	47 4	12 56	45044	445	54956	45061	446	54939	00017	99983	23
38	46 56	13 4	45489	441	54511	45507	441	54493	00018	99982	22
39	46 48	13 12	45930	436	54070	45948	437	54052	00018	99982	21
40	11 46 40	0 13 20	8.46366	433	11.53634	8.46385	432	11.53615	10.00018	9.99982	20
41	46 32	13 28	46799	427	53201	46817	428	53183	00019	99981	19
42	46 24	13 36	47226	424	52774	47245	424	52755	00019	99981	18
43	46 16	13 44	47650	419	52350	47669	420	52331	00019	99981	17
44	46 8	13 52	48069	416	51931	48089	416	51911	00020	99980	16
45	11 46 0	0 14 0	8.48485	411	11.51515	8.48505	412	11.51495	10.00020	9.99980	15
46	45 52	14 8	48896	408	51104	48917	408	51083	00021	99979	14
47	45 44	14 16	49304	404	50696	49325	404	50675	00021	99979	13
48	45 36	14 24	49708	400	50292	49729	401	50271	00021	99979	12
49	45 28	14 32	50108	396	49892	50130	397	49870	00022	99978	11
50	11 45 20	0 14 40	8.50504	393	11.49496	8.50527	393	11.49473	10.00022	9.99978	10
51	45 12	14 48	50897	390	49103	50920	390	49080	00023	99977	9
52	45 4	14 56	51287	386	48713	51310	386	48690	00023	99977	8
53	44 56	15 4	51673	382	48327	51696	383	48304	00023	99977	7
54	44 48	15 12	52055	379	47945	52079	380	47921	00024	99976	6
55	11 44 40	0 15 20	8.52434	376	11.47566	8.52459	376	11.47541	10.00024	9.99976	5
56	44 32	15 28	52810	373	47190	52835	373	47165	00025	99975	4
57	44 24	15 36	53183	369	46817	53208	370	46792	00025	99975	3
58	44 16	15 44	53552	367	46448	53578	367	46422	00026	99974	2
59	44 8	15 52	53919	363	46081	53945	363	46055	00026	99974	1
60	44 0	16 0	54282	360	45718	54308	361	45692	00026	99974	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff. 1′.	Secant.	Cotangent.	Diff. 1′.	Tangent.	Cosecant.	Sine.	M.

91° 88°

TABLE 44.

Log. Sines, Tangents, and Secants.

2° 177°

M.	Hour A. M.	Hour P. M.	Sine.	Diff. 1′.	Cosecant.	Tangent.	Diff. 1′.	Cotangent.	Secant.	Cosine.	M.
0	11 44 0	0 16 0	8.54282	360	11.45718	8.54308	361	11.45692	10.00026	9.99974	60
1	43 52	16 8	54642	357	45358	54669	358	45331	00027	99973	59
2	43 44	16 16	54999	355	45001	55027	355	44973	00027	99973	58
3	43 36	16 24	55354	351	44646	55382	352	44618	00028	99972	57
4	43 28	16 32	55705	349	44295	55734	349	44266	00028	99972	56
5	11 43 20	0 16 40	8.56054	346	11.43946	8.56083	346	11.43917	10.00029	9.99971	55
6	43 12	16 48	56400	343	43600	56429	344	43571	00029	99971	54
7	43 4	16 56	56743	341	43257	56773	341	43227	00030	99970	53
8	42 56	17 4	57084	337	42916	57114	338	42886	00030	99970	52
9	42 48	17 12	57421	336	42579	57452	336	42548	00031	99969	51
10	11 42 40	0 17 20	8.57757	332	11.42243	8.57788	333	11.42212	10.00031	9.99969	50
11	42 32	17 28	58089	330	41911	58121	330	41879	00032	99968	49
12	42 24	17 36	58419	328	41581	58451	328	41549	00032	99968	48
13	42 16	17 44	58747	325	41253	58779	326	41221	00033	99967	47
14	42 8	17 52	59072	323	40928	59105	323	40895	00033	99967	46
15	11 42 0	0 18 0	8.59395	320	11.40605	8.59428	321	11.40572	10.00033	9.99967	45
16	41 52	18 8	59715	318	40285	59749	319	40251	00034	99966	44
17	41 44	18 16	60033	316	39967	60068	316	39932	00034	99966	43
18	41 36	18 24	60349	313	39651	60384	314	39616	00035	99965	42
19	41 28	18 32	60662	311	39338	60698	311	39302	00036	99964	41
20	11 41 20	0 18 40	8.60973	309	11.39027	8.61009	310	11.38991	10.00036	9.99964	40
21	41 12	18 48	61282	307	38718	61319	307	38681	00037	99963	39
22	41 4	18 56	61589	305	38411	61626	305	38374	00037	99963	38
23	40 56	19 4	61894	302	38106	61931	303	38069	00038	99962	37
24	40 48	19 12	62196	301	37804	62234	301	37766	00038	99962	36
25	11 40 40	0 19 20	8.62497	298	11.37503	8.62535	299	11.37465	10.00039	9.99961	35
26	40 32	19 28	62795	296	37205	62834	297	37166	00039	99961	34
27	40 24	19 36	63091	294	36909	63131	295	36869	00040	99960	33
28	40 16	19 44	63385	293	36615	63426	292	36574	00040	99960	32
29	40 8	19 52	63678	290	36322	63718	291	36282	00041	99959	31
30	11 40 0	0 20 0	8.63968	288	11.36032	8.64009	289	11.35991	10.00041	9.99959	30
31	39 52	20 8	64256	287	35744	64298	287	35702	00042	99958	29
32	39 44	20 16	64543	284	35457	64585	285	35415	00042	99958	28
33	39 36	20 24	64827	283	35173	64870	284	35130	00043	99957	27
34	39 28	20 32	65110	281	34890	65154	281	34846	00044	99956	26
35	11 39 20	0 20 40	8.65391	279	11.34609	8.65435	280	11.34565	10.00044	9.99956	25
36	39 12	20 48	65670	277	34330	65715	278	34285	00045	99955	24
37	39 4	20 56	65947	276	34053	65993	276	34007	00045	99955	23
38	38 56	21 4	66223	274	33777	66269	274	33731	00046	99954	22
39	38 48	21 12	66497	272	33503	66543	273	33457	00046	99954	21
40	11 38 40	0 21 20	8.66769	270	11.33231	8.66816	271	11.33184	10.00047	9.99953	20
41	38 32	21 28	67039	269	32961	67087	269	32913	00048	99952	19
42	38 24	21 36	67308	267	32692	67356	268	32644	00048	99952	18
43	38 16	21 44	67575	266	32425	67624	266	32376	00049	99951	17
44	38 8	21 52	67841	263	32159	67890	264	32110	00049	99951	16
45	11 38 0	0 22 0	8.68104	263	11.31896	8.68154	263	11.31846	10.00050	9.99950	15
46	37 52	22 8	68367	260	31633	68417	261	31583	00051	99949	14
47	37 44	22 16	68627	259	31373	68678	260	31322	00051	99949	13
48	37 36	22 24	68886	258	31114	68938	258	31062	00052	99948	12
49	37 28	22 32	69144	256	30856	69196	257	30804	00052	99948	11
50	11 37 20	0 22 40	8.69400	254	11.30600	8.69453	255	11.30547	10.00053	9.99947	10
51	37 12	22 48	69654	253	30346	69708	254	30292	00054	99946	9
52	37 4	22 56	69907	252	30093	69962	252	30038	00054	99946	8
53	36 56	23 4	70159	250	29841	70214	251	29786	00055	99945	7
54	36 48	23 12	70409	249	29591	70465	249	29535	00056	99944	6
55	11 36 40	0 23 20	8.70658	247	11.29342	8.70714	248	11.29286	10.00056	9.99944	5
56	36 32	23 28	70905	246	29095	70962	246	29038	00057	99943	4
57	36 24	23 36	71151	244	28849	71208	245	28792	00058	99942	3
58	36 16	23 44	71395	243	28605	71453	244	28547	00058	99942	2
59	36 8	23 52	71638	242	28362	71697	243	28303	00059	99941	1
60	36 0	24 0	71880	240	28120	71940	241	28060	00060	99940	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff. 1′.	Secant.	Cotangent.	Diff. 1′.	Tangent.	Cosecant.	Sine.	M.

92° 87°

TABLE 44.

Log. Sines, Tangents, and Secants.

3° 176°

M.	Hour A. M.	Hour P. M.	Sine.	Diff. 1′.	Cosecant.	Tangent.	Diff. 1′.	Cotangent.	Secant.	Cosine.	M.
0	11 36 0	0 24 0	8. 71880	240	11. 28120	8. 71940	241	11. 28060	10. 00060	9. 99940	60
1	35 52	24 8	72120	239	27880	72181	239	27819	00060	99940	59
2	35 44	24 16	72359	238	27641	72420	239	27580	00061	99939	58
3	35 36	24 24	72597	237	27403	72659	237	27341	00062	99938	57
4	35 28	24 32	72834	235	27166	72896	236	27104	00062	99938	56
5	11 35 20	0 24 40	8. 73069	234	11. 26931	8. 73132	234	11. 26868	10. 00063	9. 99937	55
6	35 12	24 48	73303	232	26697	73366	234	26634	00064	99936	54
7	35 4	24 56	73535	232	26465	73600	232	26400	00064	99936	53
8	34 56	25 4	73767	230	26233	73832	231	26168	00065	99935	52
9	34 48	25 12	73997	229	26003	74063	229	25937	00066	99934	51
10	11 34 40	0 25 20	8. 74226	228	11. 25774	8. 74292	229	11. 25708	10. 00066	9. 99934	50
11	34 32	25 28	74454	226	25546	74521	227	25479	00067	99933	49
12	34 24	25 36	74680	226	25320	74748	226	25252	00068	99932	48
13	34 16	25 44	74906	224	25094	74974	225	25026	00068	99932	47
14	34 8	25 52	75130	223	24870	75199	224	24801	00069	99931	46
15	11 34 0	0 26 0	8. 75353	222	11. 24647	8. 75423	222	11. 24577	10. 00070	9. 99930	45
16	33 52	26 8	75575	220	24425	75645	222	24355	00071	99929	44
17	33 44	26 16	75795	220	24205	75867	220	24133	00071	99929	43
18	33 36	26 24	76015	219	23985	76087	219	23913	00072	99928	42
19	33 28	26 32	76234	217	23766	76306	219	23694	00073	99927	41
20	11 33 20	0 26 40	8. 76451	216	11. 23549	8. 76525	217	11. 23475	10. 00074	9. 99926	40
21	33 12	26 48	76667	216	23333	76742	216	23258	00074	99926	39
22	33 4	26 56	76883	214	23117	76958	215	23042	00075	99925	38
23	32 56	27 4	77097	213	22903	77173	214	22827	00076	99924	37
24	32 48	27 12	77310	212	22690	77387	213	22613	00077	99923	36
25	11 32 40	0 27 20	8. 77522	211	11. 22478	8. 77600	211	11. 22400	10. 00077	9. 99923	35
26	32 32	27 28	77733	210	22267	77811	211	22189	00078	99922	34
27	32 24	27 36	77943	209	22057	78022	210	21978	00079	99921	33
28	32 16	27 44	78152	208	21848	78232	209	21768	00080	99920	32
29	32 8	27 52	78360	208	21640	78441	208	21559	00080	99920	31
30	11 32 0	0 28 0	8. 78568	206	11. 21432	8. 78649	206	11. 21351	10. 00081	9. 99919	30
31	31 52	28 8	78774	205	21226	78855	206	21145	00082	99918	29
32	31 44	28 16	78979	204	21021	79061	205	20939	00083	99917	28
33	31 36	28 24	79183	203	20817	79266	204	20734	00083	99917	27
34	31 28	28 32	79386	202	20614	79470	203	20530	00084	99916	26
35	11 31 20	0 28 40	8. 79588	201	11. 20412	8. 79673	202	11. 20327	10. 00085	9. 99915	25
36	31 12	28 48	79789	201	20211	79875	201	20125	00086	99914	24
37	31 4	28 56	79990	199	20010	80076	201	19924	00087	99913	23
38	30 56	29 4	80189	199	19811	80277	199	19723	00087	99913	22
39	30 48	29 12	80388	197	19612	80476	198	19524	00088	99912	21
40	11 30 40	0 29 20	8. 80585	197	11. 19415	8. 80674	198	11. 19326	10. 00089	9. 99911	20
41	30 32	29 28	80782	196	19218	80872	196	19128	00090	99910	19
42	30 24	29 36	80978	195	19022	81068	196	18932	00091	99909	18
43	30 16	29 44	81173	194	18827	81264	195	18736	00091	99909	17
44	30 8	29 52	81367	193	18633	81459	194	18541	00092	99908	16
45	11 30 0	0 30 0	8. 81560	192	11. 18440	8. 81653	193	11. 18347	10. 00093	9. 99907	15
46	29 52	30 8	81752	192	18248	81846	192	18154	00094	99906	14
47	29 44	30 16	81944	190	18056	82038	192	17962	00095	99905	13
48	29 36	30 24	82134	190	17866	82230	190	17770	00096	99904	12
49	29 28	30 32	82324	189	17676	82420	190	17580	00096	99904	11
50	11 29 20	0 30 40	8. 82513	188	11. 17487	8. 82610	189	11. 17390	10. 00097	9. 99903	10
51	29 12	30 48	82701	187	17299	82799	188	17201	00098	99902	9
52	29 4	30 56	82888	187	17112	82987	188	17013	00099	99901	8
53	28 56	31 4	83075	186	16925	83175	186	16825	00100	99900	7
54	28 48	31 12	83261	185	16739	83361	186	16639	00101	99899	6
55	11 28 40	0 31 20	8. 83446	184	11. 16554	8. 83547	185	11. 16453	10. 00102	9. 99898	5
56	28 32	31 28	83630	183	16370	83732	184	16268	00102	99898	4
57	28 24	31 36	83813	183	16187	83916	184	16084	00103	99897	3
58	28 16	31 44	83996	181	16004	84100	182	15900	00104	99896	2
59	28 8	31 52	84177	181	15823	84282	182	15718	00105	99895	1
60	28 0	32 0	84358	181	15642	84464	182	15536	00106	99894	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff. 1′.	Secant.	Cotangent.	Diff. 1′.	Tangent.	Cosecant.	Sine	M.

93° 86°

TABLE 44.

Log. Sines, Tangents, and Secants.

4° 175°

M.	Hour A. M.	Hour P. M.	Sine.	Diff. 1′.	Cosecant.	Tangent.	Diff. 1′.	Cotangent.	Secant.	Cosine.	M.
0	11 28 0	0 32 0	8.84358	181	11.15642	8.84464	182	11.15536	10.00106	9.99894	60
1	27 52	32 8	84539	179	15461	84646	180	15354	00107	99893	59
2	27 44	32 16	84718	179	15282	84826	180	15174	00108	99892	58
3	27 36	32 24	84897	178	15103	85006	179	14994	00109	99891	57
4	27 28	32 32	85075	177	14925	85185	178	14815	00109	99891	56
5	11 27 20	0 32 40	8.85252	177	11.14748	8.85363	177	11.14637	10.00110	9.99890	55
6	27 12	32 48	85429	176	14571	85540	177	14460	00111	99889	54
7	27 4	32 56	85605	175	14395	85717	176	14283	00112	99888	53
8	26 56	33 4	85780	175	14220	85893	176	14107	00113	99887	52
9	26 48	33 12	85955	173	14045	86069	174	13931	00114	99886	51
10	11 26 40	0 33 20	8.86128	173	11.13872	8.86243	174	11.13757	10.00115	9.99885	50
11	26 32	33 28	86301	173	13699	86417	174	13583	00116	99884	49
12	26 24	33 36	86474	171	13526	86591	172	13409	00117	99883	48
13	26 16	33 44	86645	171	13355	86763	172	13237	00118	99882	47
14	26 8	33 52	86816	171	13184	86935	171	13065	00119	99881	46
15	11 26 0	0 34 0	8.86987	169	11.13013	8.87106	171	11.12894	10.00120	9.99880	45
16	25 52	34 8	87156	169	12844	87277	170	12723	00121	99879	44
17	25 44	34 16	87325	169	12675	87447	169	12553	00121	99879	43
18	25 36	34 24	87494	167	12506	87616	169	12384	00122	99878	42
19	25 28	34 32	87661	168	12339	87785	168	12215	00123	99877	41
20	11 25 20	0 34 40	8.87829	166	11.12171	8.87953	167	11.12047	10.00124	9.99876	40
21	25 12	34 48	87995	166	12005	88120	167	11880	00125	99875	39
22	25 4	34 56	88161	165	11839	88287	166	11713	00126	99874	38
23	24 56	35 4	88326	164	11674	88453	165	11547	00127	99873	37
24	24 48	35 12	88490	164	11510	88618	165	11382	00128	99872	36
25	11 24 40	0 35 20	8.88654	163	11.11346	8.88783	165	11.11217	10.00129	9.99871	35
26	24 32	35 28	88817	163	11183	88948	163	11052	00130	99870	34
27	24 24	35 36	88980	162	11020	89111	163	10889	00131	99869	33
28	24 16	35 44	89142	162	10858	89274	163	10726	00132	99868	32
29	24 8	35 52	89304	160	10696	89437	161	10563	00133	99867	31
30	11 24 0	0 36 0	8.89464	161	11.10536	8.89598	162	11.10402	10.00134	9.99866	30
31	23 52	36 8	89625	159	10375	89760	160	10240	00135	99865	29
32	23 44	36 16	89784	159	10216	89920	160	10080	00136	99864	28
33	23 36	36 24	89943	159	10057	90080	160	09920	00137	99863	27
34	23 28	36 32	90102	158	09898	90240	159	09760	00138	99862	26
35	11 23 20	0 36 40	8.90260	157	11.09740	8.90399	158	11.09601	10.00139	9.99861	25
36	23 12	36 48	90417	157	09583	90557	158	09443	00140	99860	24
37	23 4	36 56	90574	156	09426	90715	157	09285	00141	99859	23
38	22 56	37 4	90730	155	09270	90872	157	09128	00142	99858	22
39	22 48	37 12	90885	155	09115	91029	156	08971	00143	99857	21
40	11 22 40	0 37 20	8.91040	155	11.08960	8.91185	155	11.08815	10.00144	9.99856	20
41	22 32	37 28	91195	154	08805	91340	155	08660	00145	99855	19
42	22 24	37 36	91349	153	08651	91495	155	08505	00146	99854	18
43	22 16	37 44	91502	153	08498	91650	153	08350	00147	99853	17
44	22 8	37 52	91655	152	08345	91803	154	08197	00148	99852	16
45	11 22 0	0 38 0	8.91807	152	11.08193	8.91957	153	11.08043	10.00149	9.99851	15
46	21 52	38 8	91959	151	08041	92110	152	07890	00150	99850	14
47	21 44	38 16	92110	151	07890	92262	152	07738	00152	99848	13
48	21 36	38 24	92261	150	07739	92414	151	07586	00153	99847	12
49	21 28	38 32	92411	150	07589	92565	151	07435	00154	99846	11
50	11 21 20	0 38 40	8.92561	149	11.07439	8.92716	150	11.07284	10.00155	9.99845	10
51	21 12	38 48	92710	149	07290	92866	150	07134	00156	99844	9
52	21 4	38 56	92859	148	07141	93016	149	06984	00157	99843	8
53	20 56	39 4	93007	147	06993	93165	148	06835	00158	99842	7
54	20 48	39 12	93154	147	06846	93313	149	06687	00159	99841	6
55	11 20 40	0 39 20	8.93301	147	11.06699	8.93462	147	11.06538	10.00160	9.99840	5
56	20 32	39 28	93448	146	06552	93609	147	06391	00161	99839	4
57	20 24	39 36	93594	146	06406	93756	147	06244	00162	99838	3
58	20 16	39 44	93740	145	06260	93903	146	06097	00163	99837	2
59	20 8	39 52	93885	145	06115	94049	146	05951	00164	99836	1
60	20 0	40 0	94030	144	05970	94195	145	05805	00166	99834	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff. 1′.	Secant.	Cotangent.	Diff. 1′.	Tangent.	Cosecant.	Sine.	M.

94° 85°

TABLE 44.

Log. Sines, Tangents, and Secants.

5° A A B B C C 174°

M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	11 20 00	0 40 00	8. 94030	0	11. 05970	8. 94195	0	11. 05805	10. 00166	0	9. 99834	60
1	19 52	40 08	94174	2	05826	94340	2	05660	00167	0	99833	59
2	19 44	40 16	94317	4	05683	94485	4	05515	00168	0	99832	58
3	19 36	40 24	94461	7	05539	94630	7	05370	00169	0	99831	57
4	19 28	40 32	94603	9	05397	94773	9	05227	00170	0	99830	56
5	11 19 20	0 40 40	8. 94746	11	11. 05254	8. 94917	11	11. 05083	10. 00171	0	9. 99829	55
6	19 12	40 48	94887	13	05113	95060	13	04940	00172	0	99828	54
7	19 04	40 56	95029	15	04971	95202	15	04798	00173	0	99827	53
8	18 56	41 04	95170	18	04830	95344	18	04656	00175	0	99825	52
9	18 48	41 12	95310	20	04690	95486	20	04514	00176	0	99824	51
10	11 18 40	0 41 20	8. 95450	22	11. 04550	8. 95627	22	11. 04373	10. 00177	0	9. 99823	50
11	18 32	41 28	95589	24	04411	95767	24	04233	00178	0	99822	49
12	18 24	41 36	95728	26	04272	95908	27	04092	00179	0	99821	48
13	18 16	41 44	95867	29	04133	96047	29	03953	00180	0	99820	47
14	18 08	41 52	96005	31	03995	96187	31	03813	00181	0	99819	46
15	11 18 00	0 42 00	8. 96143	33	11. 03857	8. 96325	33	11. 03675	10. 00183	0	9. 99817	45
16	17 52	42 08	96280	35	03720	96464	35	03536	00184	0	99816	44
17	17 44	42 16	96417	37	03583	96602	38	03398	00185	0	99815	43
18	17 36	42 24	96553	39	03447	96739	40	03261	00186	0	99814	42
19	17 28	42 32	96689	42	03311	96877	42	03123	00187	0	99813	41
20	11 17 20	0 42 40	8. 96825	44	11. 03175	8. 97013	44	11. 02987	10. 00188	0	9. 99812	40
21	17 12	42 48	96960	46	03040	97150	46	02850	00190	0	99810	39
22	17 04	42 56	97095	48	02905	97285	49	02715	00191	0	99809	38
23	16 56	43 04	97229	50	02771	97421	51	02579	00192	0	99808	37
24	16 48	43 12	97363	53	02637	97556	53	02444	00193	0	99807	36
25	11 16 40	0 43 20	8. 97496	55	11. 02504	8. 97691	55	11. 02309	10. 00194	1	9. 99806	35
26	16 32	43 28	97629	57	02371	97825	58	02175	00196	1	99804	34
27	16 24	43 36	97762	59	02238	97959	60	02041	00197	1	99803	33
28	16 16	43 44	97894	61	02106	98092	62	01908	00198	1	99802	32
29	16 08	43 52	98026	64	01974	98225	64	01775	00199	1	99801	31
30	11 16 00	0 44 00	8. 98157	66	11. 01843	8. 98358	66	11. 01642	10. 00200	1	9. 99800	30
31	15 52	44 08	98288	68	01712	98490	69	01510	00202	1	99798	29
32	15 44	44 16	98419	70	01581	98622	71	01378	00203	1	99797	28
33	15 36	44 24	98549	72	01451	98753	73	01247	00204	1	99796	27
34	15 28	44 32	98679	75	01321	98884	75	01116	00205	1	99795	26
35	11 15 20	0 44 40	8. 98808	77	11. 01192	8. 99015	77	11. 00985	10. 00207	1	9. 99793	25
36	15 12	44 48	98937	79	01063	99145	80	00855	00208	1	99792	24
37	15 04	44 56	99066	81	00934	99275	82	00725	00209	1	99791	23
38	14 56	45 04	99194	83	00806	99405	84	00595	00210	1	99790	22
39	14 48	45 12	99322	86	00678	99534	86	00466	00212	1	99788	21
40	11 14 40	0 45 20	8. 99450	88	11. 00550	8. 99662	89	11. 00338	10. 00213	1	9. 99787	20
41	14 32	45 28	99577	90	00423	99791	91	00209	00214	1	99786	19
42	14 24	45 36	99704	92	00296	99919	93	00081	00215	1	99785	18
43	14 16	45 44	99830	94	00170	9. 00046	95	10. 99954	00217	1	99783	17
44	14 08	45 52	99956	96	00044	00174	97	99826	00218	1	99782	16
45	11 14 00	0 46 00	9. 00082	99	10. 99918	9. 00301	100	10. 99699	10. 00219	1	9. 99781	15
46	13 52	46 08	00207	101	99793	00427	102	99573	00220	1	99780	14
47	13 44	46 16	00332	103	99668	00553	104	99447	00222	1	99778	13
48	13 36	46 24	00456	105	99544	00679	106	99321	00223	1	99777	12
49	13 28	46 32	00581	107	99419	00805	108	99195	00224	1	99776	11
50	11 13 20	0 46 40	9. 00704	110	10. 99296	9. 00930	111	10. 99070	10. 00225	1	9. 99775	10
51	13 12	46 48	00828	112	99172	01055	113	98945	00227	1	99773	9
52	13 04	46 56	00951	114	99049	01179	115	98821	00228	1	99772	8
53	12 56	47 04	01074	116	98926	01303	117	98697	00229	1	99771	7
54	12 48	47 12	01196	118	98804	01427	120	98573	00231	1	99769	6
55	11 12 40	0 47 20	9. 01318	121	10. 98682	9. 01550	122	10. 98450	10. 00232	1	99768	5
56	12 32	47 28	01440	123	98560	01673	124	98327	00233	1	99767	4
57	12 24	47 36	01561	125	98439	01796	126	98204	00235	1	99765	3
58	12 16	47 44	01682	127	98318	01918	128	98082	00236	1	99764	2
59	12 08	47 52	01803	129	98197	02040	131	97960	00237	1	99763	1
60	12 00	48 00	01923	132	98077	02162	133	97838	00239	1	99761	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.

95° A • A B B C C 84°

Seconds of time	1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols. A	16	33	49	66	82	99	115
Prop. parts of cols. B	17	33	50	66	83	100	116
Prop. parts of cols. C	0	0	0	1	1	1	1

TABLE 44.

Log. Sines, Tangents, and Secants.

6°			A		A	B		B	C		C	173°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	11 12 00	0 48 00	9. 01923	0	10. 98077	9. 02162	0	10. 97838	10. 00239	0	9. 99761	60
1	11 52	48 08	02043	2	97957	02283	2	97717	00240	0	99760	59
2	11 44	48 16	02163	4	97837	02404	4	97596	00241	0	99759	58
3	11 36	48 24	02283	6	97717	02525	6	97475	00243	0	99757	57
4	11 28	48 32	02402	7	97598	02645	8	97355	00244	0	99756	56
5	11 11 20	0 48 40	9. 02520	9	10. 97480	9. 02766	9	10. 97234	10. 00245	0	9. 99755	55
6	11 12	48 48	02639	11	97361	02885	11	97115	00247	0	99753	54
7	11 04	48 56	02757	13	97243	03005	13	96995	00248	0	99752	53
8	10 56	49 04	02874	15	97126	03124	15	96876	00249	0	99751	52
9	10 48	49 12	02992	17	97008	03242	17	96758	00251	0	99749	51
10	11 10 40	0 49 20	9. 03109	19	10. 96891	9. 03361	19	10. 96639	10. 00252	0	9. 99748	50
11	10 32	49 28	03226	20	96774	03479	21	96521	00253	0	99747	49
12	10 24	49 36	03342	22	96658	03597	23	96403	00255	0	99745	48
13	10 16	49 44	03458	24	96542	03714	24	96286	00256	0	99744	47
14	10 08	49 52	03574	26	96426	03832	26	96168	00258	0	99742	46
15	11 10 00	0 50 00	9. 03690	28	10. 96310	9. 03948	28	10. 96052	10. 00259	0	9. 99741	45
16	9 52	50 08	03805	30	96195	04065	30	95935	00260	0	99740	44
17	9 44	50 16	03920	31	96080	04181	32	95819	00262	0	99738	43
18	9 36	50 24	04034	33	95966	04297	34	95703	00263	0	99737	42
19	9 28	50 32	04149	35	95851	04413	36	95587	00264	0	99736	41
20	11 9 20	0 50 40	9. 04262	37	10. 95738	9. 04528	38	10. 95472	10. 00266	0	9. 99734	40
21	9 12	50 48	04376	39	95624	04643	39	95357	00267	1	99733	39
22	9 04	50 56	04490	41	95510	04758	41	95242	00269	1	99731	38
23	8 56	51 04	04603	43	95397	04873	43	95127	00270	1	99730	37
24	8 48	51 12	04715	44	95285	04987	45	95013	00272	1	99728	36
25	11 8 40	0 51 20	9. 04828	46	10. 95172	9. 05101	47	10. 94899	10. 00273	1	9. 99727	35
26	8 32	51 28	04940	48	95060	05214	49	94786	00274	1	99726	34
27	8 24	51 36	05052	50	94948	05328	51	94672	00276	1	99724	33
28	8 16	51 44	05164	52	94836	05441	53	94559	00277	1	99723	32
29	8 08	51 52	05275	54	94725	05553	54	94447	00279	1	99721	31
30	11 8 00	0 52 00	9. 05386	56	10. 94614	9. 05666	56	10. 94334	10. 00280	1	9. 99720	30
31	7 52	52 08	05497	57	94503	05778	58	94222	00282	1	99718	29
32	7 44	52 16	05607	59	94393	05890	60	94110	00283	1	99717	28
33	7 36	52 24	05717	61	94283	06002	62	93998	00284	1	99716	27
34	7 28	52 32	05827	63	94173	06113	64	93887	00286	1	99714	26
35	11 7 20	0 52 40	9. 05937	65	10. 94063	9. 06224	66	10. 93776	10. 00287	1	9. 99713	25
36	7 12	52 48	06046	67	93954	06335	68	93665	00289	1	99711	24
37	7 04	52 56	06155	69	93845	06445	69	93555	00290	1	99710	23
38	6 56	53 04	06264	70	93736	06556	71	93444	00292	1	99708	22
39	6 48	53 12	06372	72	93628	06666	73	93334	00293	1	99707	21
40	11 6 40	0 53 20	9. 06481	74	10. 93519	9. 06775	75	10. 93225	10. 00295	1	9. 99705	20
41	6 32	53 28	06589	76	93411	06885	77	93115	00296	1	99704	19
42	6 24	53 36	06696	78	93304	06994	79	93006	00298	1	99702	18
43	6 16	53 44	06804	80	93196	07103	81	92897	00299	1	99701	17
44	6 08	53 52	06911	81	93089	07211	83	92789	00301	1	99699	16
45	11 6 00	0 54 00	9. 07018	83	10. 92982	9. 07320	84	10. 92680	10. 00302	1	9. 99698	15
46	5 52	54 08	07124	85	92876	07428	86	92572	00304	1	99696	14
47	5 44	54 16	07231	87	92769	07536	88	92464	00305	1	99695	13
48	5 36	54 24	07337	89	92663	07643	90	92357	00307	1	99693	12
49	5 28	54 32	07442	91	92558	07751	92	92249	00308	1	99692	11
50	11 5 20	0 54 40	9. 07548	93	10. 92452	9. 07858	94	10. 92142	10. 00310	1	9. 99690	10
51	5 12	54 48	07653	94	92347	07964	96	92036	00311	1	99689	9
52	5 04	54 56	07758	96	92242	08071	98	91929	00313	1	99687	8
53	4 56	55 04	07863	98	92137	08177	99	91823	00314	1	99686	7
54	4 48	55 12	07968	100	92032	08283	101	91717	00316	1	99684	6
55	11 4 40	0 55 20	9. 08072	102	10. 91928	9. 08389	103	10. 91611	10. 00317	1	9. 99683	5
56	4 32	55 28	08176	104	91824	08495	105	91505	00319	1	99681	4
57	4 24	55 36	08280	106	91720	08600	107	91400	00320	1	99680	3
58	4 16	55 44	08383	107	91617	08705	109	91295	00322	1	99678	2
59	4 08	55 52	08486	109	91514	08810	111	91190	00323	1	99677	1
60	4 00	56 00	08589	111	91411	08914	113	91086	00325	1	99675	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
96°			A		A	B		B	C		C	83°

Seconds of time		1ˢ	2ˢ	3ˢ	4ˢ	5ˢ	6ˢ	7ˢ
Prop. parts of cols.	A	14	28	42	56	69	83	97
	B	14	28	42	56	70	84	98
	C	0	0	1	1	1	1	1

TABLE 44.

Log. Sines, Tangents, and Secants.

7°			A		A	B		B	C		C	172°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	11 4 0	0 56 0	9. 08589	0	10. 91411	9. 08914	0	10. 91086	10. 00325	0	9. 99675	60
1	3 52	56 8	08692	2	91308	09019	2	90981	00326	0	99674	59
2	3 44	56 16	08795	3	91205	09123	3	90877	00328	0	99672	58
3	3 36	56 24	08897	5	91103	09227	5	90773	00330	0	99670	57
4	3 28	56 32	08999	6	91001	09330	7	90670	00331	0	99669	56
5	11 3 20	0 56 40	9. 09101	8	10. 90899	9. 09434	8	10. 90566	10. 00333	0	9. 99667	55
6	3 12	56 48	09202	10	90798	09537	10	90463	00334	0	99666	54
7	3 4	56 56	09304	11	90696	09640	11	90360	00336	0	99664	53
8	2 56	57 4	09405	13	90595	09742	13	90258	00337	0	99663	52
9	2 48	57 12	09506	14	90494	09845	15	90155	00339	0	99661	51
10	11 2 40	0 57 20	9. 09606	16	10. 90394	9. 09947	16	10. 90053	10. 00341	0	9. 99659	50
11	2 32	57 28	09707	18	90293	10049	18	89951	00342	0	99658	49
12	2 24	57 36	09807	19	90193	10150	20	89850	00344	0	99656	48
13	2 16	57 44	09907	21	90093	10252	21	89748	00345	0	99655	47
14	2 8	57 52	10006	22	89994	10353	23	89647	00347	0	99653	46
15	11 2 0	0 58 0	9. 10106	24	10. 89894	9. 10454	24	10. 89546	10. 00349	0	9. 99651	45
16	1 52	58 8	10205	26	89795	10555	26	89445	00350	0	99650	44
17	1 44	58 16	10304	27	89696	10656	28	89344	00352	0	99648	43
18	1 36	58 24	10402	29	89598	10756	29	89244	00353	1	99647	42
19	1 28	58 32	10501	30	89499	10856	31	89144	00355	1	99645	41
20	11 1 20	0 58 40	9. 10599	32	10. 89401	9. 10956	33	10. 89044	10. 00357	1	9. 99643	40
21	1 12	58 48	10697	34	89303	11056	34	88944	00358	1	99642	39
22	1 4	58 56	10795	35	89205	11155	36	88845	00360	1	99640	38
23	0 56	59 4	10893	37	89107	11254	37	88746	00362	1	99638	37
24	0 48	59 12	10990	38	89010	11353	39	88647	00363	1	99637	36
25	11 0 40	0 59 20	9. 11087	40	10. 88913	9. 11452	41	10. 88548	10. 00365	1	9. 99635	35
26	0 32	59 28	11184	42	88816	11551	42	88449	00367	1	99633	34
27	0 24	59 36	11281	43	88719	11649	44	88351	00368	1	99632	33
28	0 16	59 44	11377	45	88623	11747	46	88253	00370	1	99630	32
29	0 8	59 52	11474	46	88526	11845	47	88155	00371	1	99629	31
30	11 0 0	1 0 0	9. 11570	48	10. 88430	9. 11943	49	10. 88057	10. 00373	1	9. 99627	30
31	10 59 52	0 8	11666	50	88334	12040	51	87960	00375	1	99625	29
32	59 44	0 16	11761	51	88239	12138	52	87862	00376	1	99624	28
33	59 36	0 24	11857	53	88143	12235	54	87765	00378	1	99622	27
34	59 28	0 32	11952	54	88048	12332	55	87668	00380	1	99620	26
35	10 59 20	1 0 40	9. 12047	56	10. 87953	9. 12428	57	10. 87572	10. 00382	1	9. 99618	25
36	59 12	0 48	12142	58	87858	12525	59	87475	00383	1	99617	24
37	59 4	0 56	12236	59	87764	12621	60	87379	00385	1	99615	23
38	58 56	1 4	12331	61	87669	12717	62	87283	00387	1	99613	22
39	58 48	1 12	12425	62	87575	12813	64	87187	00388	1	99612	21
40	10 58 40	1 1 20	9. 12519	64	10. 87481	9. 12909	65	10. 87091	10. 00390	1	9. 99610	20
41	58 32	1 28	12612	66	87388	13004	67	86996	00392	1	99608	19
42	58 24	1 36	12706	67	87294	13099	68	86901	00393	1	99607	18
43	58 16	1 44	12799	69	87201	13194	70	86806	00395	1	99605	17
44	58 8	1 52	12892	70	87108	13289	72	86711	00397	1	99603	16
45	10 58 0	1 2 0	9. 12985	72	10. 87015	9. 13384	73	10. 86616	10. 00399	1	9. 99601	15
46	57 52	2 8	13078	74	86922	13478	75	86522	00400	1	99600	14
47	57 44	2 16	13171	75	86829	13573	77	86427	00402	1	99598	13
48	57 36	2 24	13263	77	86737	13667	78	86333	00404	1	99596	12
49	57 28	2 32	13355	78	86645	13761	80	86239	00405	1	99595	11
50	10 57 20	1 2 40	9. 13447	80	10. 86553	9. 13854	81	10. 86146	10. 00407	1	9. 99593	10
51	57 12	2 48	13539	82	86461	13948	83	86052	00409	1	99591	9
52	57 4	2 56	13630	83	86370	14041	85	85959	00411	1	99589	8
53	56 56	3 4	13722	85	86278	14134	86	85866	00412	1	99588	7
54	56 48	3 12	13813	87	86187	14227	88	85773	00414	2	99586	6
55	10 56 40	1 3 20	9. 13904	88	10. 86096	9. 14320	90	10. 85680	10. 00416	2	9. 99584	5
56	56 32	3 28	13994	90	86006	14412	91	85588	00418	2	99582	4
57	56 24	3 36	14085	91	85915	14504	93	85496	00419	2	99581	3
58	56 16	3 44	14175	93	85825	14597	95	85403	00421	2	99579	2
59	56 8	3 52	14266	95	85734	14688	96	85312	00423	2	99577	1
60	56 0	4 0	14356	96	85644	14780	98	85220	00425	2	99575	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
97°			A		A	B		B	C		C	82°

Seconds of time		1ˢ	2ˢ	3ˢ	4ˢ	5ˢ	6ˢ	7ˢ
Prop. parts of cols.	A	12	24	36	48	60	72	84
	B	12	24	37	49	61	73	86
	C	0	0	1	1	1	1	1

TABLE 44.

Log. Sines, Tangents, and Secants.

8°			A		A	B		B	C		C	171°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	10 56 0	1 4 0	9. 14356	0	10. 85644	9. 14780	0	10. 85220	10. 00425	0	9. 99575	60
1	55 52	4 8	14445	1	85555	14872	1	85128	00426	0	99574	59
2	55 44	4 16	14535	3	85465	14963	3	85037	00428	0	99572	58
3	55 36	4 24	14624	4	85376	15054	4	84946	00430	0	99570	57
4	55 28	4 32	14714	6	85286	15145	6	84855	00432	0	99568	56
5	10 55 20	1 4 40	9. 14803	7	10. 85197	9. 15236	7	10. 84764	10. 00434	0	9. 99566	55
6	55 12	4 48	14891	8	85109	15327	9	84673	00435	0	99565	54
7	55 4	4 56	14980	10	85020	15417	10	84583	00437	0	99563	53
8	54 56	5 4	15069	11	84931	15508	12	84492	00439	0	99561	52
9	54 48	5 12	15157	13	84843	15598	13	84402	00441	0	99559	51
10	10 54 40	1 5 20	9. 15245	14	10. 84755	9. 15688	14	10. 84312	10. 00443	0	9. 99557	50
11	54 32	5 28	15333	16	84667	15777	16	84223	00444	0	99556	49
12	54 24	5 36	15421	17	84579	15867	17	84133	00446	0	99554	48
13	54 16	5 44	15508	18	84492	15956	19	84044	00448	0	99552	47
14	54 8	5 52	15596	20	84404	16046	20	83954	00450	0	99550	46
15	10 54 0	1 6 0	9. 15683	21	10. 84317	9. 16135	22	10. 83865	10. 00452	0	9. 99548	45
16	53 52	6 8	15770	23	84230	16224	23	83776	00454	1	99546	44
17	53 44	6 16	15857	24	84143	16312	25	83688	00455	1	99545	43
18	53 36	6 24	15944	25	84056	16401	26	83599	00457	1	99543	42
19	53 28	6 32	16030	27	83970	16489	27	83511	00459	1	99541	41
20	10 53 20	1 6 40	9. 16116	28	10. 83884	9. 16577	29	10. 83423	10. 00461	1	9. 99539	40
21	53 12	6 48	16203	30	83797	16665	30	83335	00463	1	99537	39
22	53 4	6 56	16289	31	83711	16753	32	83247	00465	1	99535	38
23	52 56	7 4	16374	32	83626	16841	33	83159	00467	1	99533	37
24	52 48	7 12	16460	34	83540	16928	35	83072	00468	1	99532	36
25	10 52 40	1 7 20	9. 16545	35	10. 83455	9. 17016	36	10. 82984	10. 00470	1	9. 99530	35
26	52 32	7 28	16631	37	83369	17103	37	82897	00472	1	99528	34
27	52 24	7 36	16716	38	83284	17190	39	82810	00474	1	99526	33
28	52 16	7 44	16801	39	83199	17277	40	82723	00476	1	99524	32
29	52 8	7 52	16886	41	83114	17363	42	82637	00478	1	99522	31
30	10 52 0	1 8 0	9. 16970	42	10. 83030	9. 17450	43	10. 82550	10. 00480	1	9. 99520	30
31	51 52	8 8	17055	44	82945	17536	45	82464	00482	1	99518	29
32	51 44	8 16	17139	45	82861	17622	46	82378	00483	1	99517	28
33	51 36	8 24	17223	47	82777	17708	48	82292	00485	1	99515	27
34	51 28	8 32	17307	48	82693	17794	49	82206	00487	1	99513	26
35	10 51 20	1 8 40	9. 17391	49	10. 82609	9. 17880	50	10. 82120	10. 00489	1	9. 99511	25
36	51 12	8 48	17474	51	82526	17965	52	82035	00491	1	99509	24
37	51 4	8 56	17558	52	82442	18051	53	81949	00493	1	99507	23
38	50 56	9 4	17641	54	82359	18136	55	81864	00495	1	99505	22
39	50 48	9 12	17724	55	82276	18221	56	81779	00497	1	99503	21
40	10 50 40	1 9 20	9. 17807	56	10. 82193	9. 18306	58	10. 81694	10. 00499	1	9. 99501	20
41	50 32	9 28	17890	58	82110	18391	59	81609	00501	1	99499	19
42	50 24	9 36	17973	59	82027	18475	61	81525	00503	1	99497	18
43	50 16	9 44	18055	61	81945	18560	62	81440	00505	1	99495	17
44	50 8	9 52	18137	62	81863	18644	63	81356	00506	1	99494	16
45	10 50 0	1 10 0	9. 18220	63	10. 81780	9. 18728	65	10. 81272	10. 00508	1	9. 99492	15
46	49 52	10 8	18302	65	81698	18812	66	81188	00510	1	99490	14
47	49 44	10 16	18383	66	81617	18896	68	81104	00512	1	99488	13
48	49 36	10 24	18465	68	81535	18979	69	81021	00514	2	99486	12
49	49 28	10 32	18547	69	81453	19063	71	80937	00516	2	99484	11
50	10 49 20	1 10 40	9. 18628	71	10. 81372	9. 19146	72	10. 80854	10. 00518	2	9. 99482	10
51	49 12	10 48	18709	72	81291	19229	74	80771	00520	2	99480	9
52	49 4	10 56	18790	73	81210	19312	75	80688	00522	2	99478	8
53	48 56	11 4	18871	75	81129	19395	76	80605	00524	2	99476	7
54	48 48	11 12	18952	76	81048	19478	78	80522	00526	2	99474	6
55	10 48 40	1 11 20	9. 19033	78	10. 80967	9. 19561	79	10. 80439	10. 00528	2	9. 99472	5
56	48 32	11 28	19113	79	80887	19643	81	80357	00530	2	99470	4
57	48 24	11 36	19193	80	80807	19725	82	80275	00532	2	99468	3
58	48 16	11 44	19273	82	80727	19807	84	80193	00534	2	99466	2
59	48 8	11 52	19353	83	80647	19889	85	80111	00536	2	99464	1
60	48 0	12 0	19433	85	80567	19971	87	80029	00538	2	99462	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
98°			A		A	B		B	C		C .	81°

Seconds of time		1ˢ	2ˢ	3ˢ	4ˢ	5ˢ	6ˢ	7ˢ
Prop. parts of cols.	A	11	21	32	42	53	63	74
	B	11	22	32	43	54	65	76
	C	0	0	1	1	1	1	2

TABLE 44.

Log. Sines, Tangents, and Secants.

9°			A		A	B		B	C		C	170°
M.	Hour A.M.	Hour P.M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	10 48 0	1 12 0	9.19433	0	10.80567	9.19971	0	10.80029	10.00538	0	9.99462	60
1	47 52	12 8	19513	1	80487	20053	1	79947	00540	0	99460	59
2	47 44	12 16	19592	3	80408	20134	3	79865	00542	0	99458	58
3	47 36	12 24	19672	4	80328	20216	4	79784	00544	0	99456	57
4	47 28	12 32	19751	5	80249	20297	5	79703	00546	0	99454	56
5	10 47 20	1 12 40	9.19830	6	10.80170	9.20378	6	10.79622	10.00548	0	9.99452	55
6	47 12	12 48	19909	8	80091	20459	8	79541	00550	0	99450	54
7	47 4	12 56	19988	9	80012	20540	9	79460	00552	0	99448	53
8	46 56	13 4	20067	10	79933	20621	10	79379	00554	0	99446	52
9	46 48	13 12	20145	11	79855	20701	12	79299	00556	0	99444	51
10	10 46 40	1 13 20	9.20223	13	10.79777	9.20782	13	10.79218	10.00558	0	9.99442	50
11	46 32	13 28	20302	14	79698	20862	14	79138	00560	0	99440	49
12	46 24	13 36	20380	15	79620	20942	16	79058	00562	0	99438	48
13	46 16	13 44	20458	16	79542	21022	17	78978	00564	0	99436	47
14	46 8	13 52	20535	18	79465	21102	18	78898	00566	0	99434	46
15	10 46 0	1 14 0	9.20613	19	10.79387	9.21182	19	10.78818	10.00568	1	9.99432	45
16	45 52	14 8	20691	20	79309	21261	21	78739	00571	1	99429	44
17	45 44	14 16	20768	21	79232	21341	22	78659	00573	1	99427	43
18	45 36	14 24	20845	23	79155	21420	23	78580	00575	1	99425	42
19	45 28	14 32	20922	24	79078	21499	25	78501	00577	1	99423	41
20	10 45 20	1 14 40	9.20999	25	10.79001	9.21578	26	10.78422	10.00579	1	9.99421	40
21	45 12	14 48	21076	26	78924	21657	27	78343	00581	1	99419	39
22	45 4	14 56	21153	28	78847	21736	28	78264	00583	1	99417	38
23	44 56	15 4	21229	29	78771	21814	30	78186	00585	1	99415	37
24	44 48	15 12	21306	30	78694	21893	31	78107	00587	1	99413	36
25	10 44 40	1 15 20	9.21382	31	10.78618	9.21971	32	10.78029	10.00589	1	9.99411	35
26	44 32	15 28	21458	33	78542	22049	34	77951	00591	1	99409	34
27	44 24	15 36	21534	34	78466	22127	35	77873	00593	1	99407	33
28	44 16	15 44	21610	35	78390	22205	36	77795	00596	1	99404	32
29	44 8	15 52	21685	37	78315	22283	38	77717	00598	1	99402	31
30	10 44 0	1 16 0	9.21761	38	10.78239	9.22361	39	10.77639	10.00600	1	9.99400	30
31	43 52	16 8	21836	39	78164	22438	40	77562	00602	1	99398	29
32	43 44	16 16	21912	40	78088	22516	41	77484	00604	1	99396	28
33	43 36	16 24	21987	42	78013	22593	43	77407	00606	1	99394	27
34	43 28	16 32	22062	43	77938	22670	44	77330	00608	1	99392	26
35	10 43 20	1 16 40	9.22137	44	10.77863	9.22747	45	10.77253	10.00610	1	9.99390	25
36	43 12	16 48	22211	45	77789	22824	47	77176	00612	1	99388	24
37	43 4	16 56	22286	47	77714	22901	48	77099	00615	1	99385	23
38	42 56	17 4	22361	48	77639	22977	49	77023	00617	1	99383	22
39	42 48	17 12	22435	49	77565	23054	50	76946	00619	1	99381	21
40	10 42 40	1 17 20	9.22509	50	10.77491	9.23130	52	10.76870	10.00621	1	9.99379	20
41	42 32	17 28	22583	52	77417	23206	53	76794	00623	1	99377	19
42	42 24	17 36	22657	53	77343	23283	54	76717	00625	1	99375	18
43	42 16	17 44	22731	54	77269	23359	56	76641	00628	2	99372	17
44	42 8	17 52	22805	55	77195	23435	57	76565	00630	2	99370	16
45	10 42 0	1 18 0	9.22878	57	10.77122	9.23510	58	10.76490	10.00632	2	9.99368	15
46	41 52	18 8	22952	58	77048	23586	60	76414	00634	2	99366	14
47	41 44	18 16	23025	59	76975	23661	61	76339	00636	2	99364	13
48	41 36	18 24	23098	60	76902	23737	62	76263	00638	2	99362	12
49	41 28	18 32	23171	62	76829	23812	63	76188	00641	2	99359	11
50	10 41 20	1 18 40	9.23244	63	10.76756	9.23887	65	10.76113	10.00643	2	9.99357	10
51	41 12	18 48	23317	64	76683	23962	66	76038	00645	2	99355	9
52	41 4	18 56	23390	65	76610	24037	67	75963	00647	2	99353	8
53	40 56	19 4	23462	67	76538	24112	69	75888	00649	2	99351	7
54	40 48	19 12	23535	68	76465	24186	70	75814	00652	2	99348	6
55	10 40 40	1 19 20	9.23607	69	10.76393	9.24261	71	10.75739	10.00654	2	9.99346	5
56	40 32	19 28	23679	71	76321	24335	73	75665	00656	2	99344	4
57	40 24	19 36	23752	72	76248	24410	74	75590	00658	2	99342	3
58	40 16	19 44	23823	73	76177	24484	75	75516	00660	2	99340	2
59	40 8	19 52	23895	74	76105	24558	76	75442	00663	2	99337	1
60	40 0	20 0	23967	76	76033	24632	78	75368	00665	2	99335	0
M.	Hour P.M.	Hour A.M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
99°			A		A	B		B	C		C	80°

Seconds of time		1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols.	A	9	19	28	38	47	57	66
	B	10	19	29	39	49	58	68
	C	0	1	1	1	1	2	2

TABLE 44.

Log. Sines, Tangents, and Secants.

10°			A		A	B		B	C		C	169°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	10 40 0	1 20 0	9.23967	0	10.76033	9.24632	0	10.75368	10.00665	0	9.99335	60
1	39 52	20 8	24039	1	75961	24706	1	75294	00667	0	99333	59
2	39 44	20 16	24110	2	75890	24779	2	75221	00669	0	99331	58
3	39 36	20 24	24181	3	75819	24853	4	75147	00672	0	99328	57
4	39 28	20 32	24253	5	75747	24926	5	75074	00674	0	99326	56
5	10 39 20	1 20 40	9.24324	6	10.75676	9.25000	6	10.75000	10.00676	0	9.99324	55
6	39 12	20 48	24395	7	75605	25073	7	74927	00678	0	99322	54
7	39 4	20 56	24466	8	75534	25146	8	74854	00681	0	99319	53
8	38 56	21 4	24536	9	75464	25219	9	74781	00683	0	99317	52
9	38 48	21 12	24607	10	75393	25292	11	74708	00685	0	99315	51
10	10 38 40	1 21 20	9.24677	11	10.75323	9.25365	12	10.74635	10.00687	0	9.99313	50
11	38 32	21 28	24748	13	75252	25437	13	74563	00690	0	99310	49
12	38 24	21 36	24818	14	75182	25510	14	74490	00692	0	99308	48
13	38 16	21 44	24888	15	75112	25582	15	74418	00694	1	99306	47
14	38 8	21 52	24958	16	75042	25655	16	74345	00696	1	99304	46
15	10 38 0	1 22 0	9.25028	17	10.74972	9.25727	18	10.74273	10.00699	1	9.99301	45
16	37 52	22 8	25098	18	74902	25799	19	74201	00701	1	99299	44
17	37 44	22 16	25168	19	74832	25871	20	74129	00703	1	99297	43
18	37 36	22 24	25237	20	74763	25943	21	74057	00706	1	99294	42
19	37 28	22 32	25307	22	74693	26015	22	73985	00708	1	99292	41
20	10 37 20	1 22 40	9.25376	23	10.74624	9.26086	24	10.73914	10.00710	1	9.99290	40
21	37 12	22 48	25445	24	74555	26158	25	73842	00712	1	99288	39
22	37 4	22 56	25514	25	74486	26229	26	73771	00715	1	99285	38
23	36 56	23 4	25583	26	74417	26301	27	73699	00717	1	99283	37
24	36 48	23 12	25652	27	74348	26372	28	73628	00719	1	99281	36
25	10 36 40	1 23 20	9.25721	28	10.74279	9.26443	29	10.73557	10.00722	1	9.99278	35
26	36 32	23 28	25790	30	74210	26514	31	73486	00724	1	99276	34
27	36 24	23 36	25858	31	74142	26585	32	73415	00726	1	99274	33
28	36 16	23 44	25927	32	74073	26655	33	73345	00729	1	99271	32
29	36 8	23 52	25995	33	74005	26726	34	73274	00731	1	99269	31
30	10 36 0	1 24 0	9.26063	34	10.73937	9.26797	35	10.73203	10.00733	1	9.99267	30
31	35 52	24 8	26131	35	73869	26867	36	73133	00736	1	99264	29
32	35 44	24 16	26199	36	73801	26937	38	73063	00738	1	99262	28
33	35 36	24 24	26267	38	73733	27008	39	72992	00740	1	99260	27
34	35 28	24 32	26335	39	73665	27078	40	72922	00743	1	99257	26
35	10 35 20	1 24 40	9.26403	40	10.73597	9.27148	41	10.72852	10.00745	1	9.99255	25
36	35 12	24 48	26470	41	73530	27218	42	72782	00748	1	99252	24
37	35 4	24 56	26538	42	73462	27288	44	72712	00750	1	99250	23
38	34 56	25 4	26605	43	73395	27357	45	72643	00752	1	99248	22
39	34 48	25 12	26672	44	73328	27427	46	72573	00755	2	99245	21
40	10 34 40	1 25 20	9.26739	45	10.73261	9.27496	47	10.72504	10.00757	2	9.99243	20
41	34 32	25 28	26806	47	73194	27566	48	72434	00759	2	99241	19
42	34 24	25 36	26873	48	73127	27635	49	72365	00762	2	99238	18
43	34 16	25 44	26940	49	73060	27704	51	72296	00764	2	99236	17
44	34 8	25 52	27007	50	72993	27773	52	72227	00767	2	99233	16
45	10 34 0	1 26 0	9.27073	51	10.72927	9.27842	53	10.72158	10.00769	2	9.99231	15
46	33 52	26 8	27140	52	72860	27911	54	72089	00771	2	99229	14
47	33 44	26 16	27206	53	72794	27980	55	72020	00774	2	99226	13
48	33 36	26 24	27273	55	72727	28049	56	71951	00776	2	99224	12
49	33 28	26 32	27339	56	72661	28117	58	71883	00779	2	99221	11
50	10 33 20	1 26 40	9.27405	57	10.72595	9.28186	59	10.71814	10.00781	2	9.99219	10
51	33 12	26 48	27471	58	72529	28254	60	71746	00783	2	99217	9
52	33 4	26 56	27537	59	72463	28323	61	71677	00786	2	99214	8
53	32 56	27 4	27602	60	72398	28391	62	71609	00788	2	99212	7
54	32 48	27 12	27668	61	72332	28459	63	71541	00791	2	99209	6
55	10 32 40	1 27 20	9.27734	63	10.72266	9.28527	65	10.71473	10.00793	2	9.99207	5
56	32 32	27 28	27799	64	72201	28595	66	71405	00796	2	99204	4
57	32 24	27 36	27864	65	72136	28662	67	71338	00798	2	99202	3
58	32 16	27 44	27930	66	72070	28730	68	71270	00800	2	99200	2
59	32 8	27 52	27995	67	72005	28798	69	71202	00803	2	99197	1
60	32 0	28 0	28060	68	71940	28865	71	71135	00805	2	99195	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
100°			A		A	B		B	C		C	79°

Seconds of time ……	1^s	2^s	3^s	4^s	5^s	6^s	7^s
Prop. parts of cols. A	9	17	26	34	43	51	60
Prop. parts of cols. B	9	18	26	35	44	53	62
Prop. parts of cols. C	0	1	1	1	1	2	2

TABLE 44.

Log. Sines, Tangents, and Secants.

11°			A		A	B		B	C		C	168°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	10 32 0	1 28 0	9.28060	0	10.71940	9.28865	0	10.71135	10.00805	0	9.99195	60
1	31 52	28 8	28125	1	71875	28933	1	71067	00808	0	99192	59
2	31 44	28 16	28190	2	71810	29000	2	71000	00810	0	99190	58
3	31 36	28 24	28254	3	71746	29067	3	70933	00813	0	99187	57
4	31 28	28 32	28319	4	71681	29134	4	70866	00815	0	99185	56
5	10 31 20	1 28 40	9.28384	5	10.71616	9.29201	5	10.70799	10.00818	0	9.99182	55
6	31 12	28 48	28448	6	71552	29268	6	70732	00820	0	99180	54
7	31 4	28 56	28512	7	71488	29335	8	70665	00823	0	99177	53
8	30 56	29 4	28577	8	71423	29402	9	70598	00825	0	99175	52
9	30 48	29 12	28641	9	71359	29468	10	70532	00828	0	99172	51
10	10 30 40	1 29 20	9.28705	10	10.71295	9.29535	11	10.70465	10.00830	0	9.99170	50
11	30 32	29 28	28769	11	71231	29601	12	70399	00833	0	99167	49
12	30 24	29 36	28833	12	71167	29668	13	70332	00835	1	99165	48
13	30 16	29 44	28896	13	71104	29734	14	70266	00838	1	99162	47
14	30 8	29 52	28960	14	71040	29800	15	70200	00840	1	99160	46
15	10 30 0	1 30 0	9.29024	16	10.70976	9.29866	16	10.70134	10.00843	1	9.99157	45
16	29 52	30 8	29087	17	70913	29932	17	70068	00845	1	99155	44
17	29 44	30 16	29150	18	70850	29998	18	70002	00848	1	99152	43
18	29 36	30 24	29214	19	70786	30064	19	69936	00850	1	99150	42
19	29 28	30 32	29277	20	70723	30130	20	69870	00853	1	99147	41
20	10 29 20	1 30 40	9.29340	21	10.70660	9.30195	22	10.69805	10.00855	1	9.99145	40
21	29 12	30 48	29403	22	70597	30261	23	69739	00858	1	99142	39
22	29 4	30 56	29466	23	70534	30326	24	69674	00860	1	99140	38
23	28 56	31 4	29529	24	70471	30391	25	69609	00863	1	99137	37
24	28 48	31 12	29591	25	70409	30457	26	69543	00865	1	99135	36
25	10 28 40	1 31 20	9.29654	26	10.70346	9.30522	27	10.69478	10.00868	1	9.99132	35
26	28 32	31 28	29716	27	70284	30587	28	69413	00870	1	99130	34
27	28 24	31 36	29779	28	70221	30652	29	69348	00873	1	99127	33
28	28 16	31 44	29841	29	70159	30717	30	69283	00876	1	99124	32
29	28 8	31 52	29903	30	70097	30782	31	69218	00878	1	99122	31
30	10 28 0	1 32 0	9.29966	31	10.70034	9.30846	32	10.69154	10.00881	1	9.99119	30
31	27 52	32 8	30028	32	69972	30911	33	69089	00883	1	99117	29
32	27 44	32 16	30090	33	69910	30975	35	69025	00886	1	99114	28
33	27 36	32 24	30151	34	69849	31040	36	68960	00888	1	99112	27
34	27 28	32 32	30213	35	69787	31104	37	68896	00891	1	99109	26
35	10 27 20	1 32 40	9.30275	36	10.69725	9.31168	38	10.68832	10.00894	2	9.99106	25
36	27 12	32 48	30336	37	69664	31233	39	68767	00896	2	99104	24
37	27 4	32 56	30398	38	69602	31297	40	68703	00899	2	99101	23
38	26 56	33 4	30459	39	69541	31361	41	68639	00901	2	99099	22
39	26 48	33 12	30521	40	69479	31425	42	68575	00904	2	99096	21
40	10 26 40	1 33 20	9.30582	41	10.69418	9.31489	43	10.68511	10.00907	2	9.99093	20
41	26 32	33 28	30643	42	69357	31552	44	68448	00909	2	99091	19
42	26 24	33 36	30704	43	69296	31616	45	68384	00912	2	99088	18
43	26 16	33 44	30765	45	69235	31679	46	68321	00914	2	99086	17
44	26 8	33 52	30826	46	69174	31743	47	68257	00917	2	99083	16
45	10 26 0	1 34 0	9.30887	47	10.69113	9.31806	49	10.68194	10.00920	2	9.99080	15
46	25 52	34 8	30947	48	69053	31870	50	68130	00922	2	99078	14
47	25 44	34 16	31008	49	68992	31933	51	68067	00925	2	99075	13
48	25 36	34 24	31068	50	68932	31996	52	68004	00928	2	99072	12
49	25 28	34 32	31129	51	68871	32059	53	67941	00930	2	99070	11
50	10 25 20	1 34 40	9.31189	52	10.68811	9.32122	54	10.67878	10.00933	2	9.99067	10
51	25 12	34 48	31250	53	68750	32185	55	67815	00936	2	99064	9
52	25 4	34 56	31310	54	68690	32248	56	67752	00938	2	99062	8
53	24 56	35 4	31370	55	68630	32311	57	67689	00941	2	99059	7
54	24 48	35 12	31430	56	68570	32373	58	67627	00944	2	99056	6
55	10 24 40	1 35 20	9.31490	57	10.68510	9.32436	59	10.67564	10.00946	2	9.99054	5
56	24 32	35 28	31549	58	68451	32498	60	67502	00949	2	99051	4
57	24 24	35 36	31609	59	68391	32561	61	67439	00952	2	99048	3
58	24 16	35 44	31669	60	68331	32623	63	67377	00954	2	99046	2
59	24 8	35 52	31728	61	68272	32685	64	67315	00957	3	99043	1
60	24 0	36 0	31788	62	68212	32747	65	67253	00960	3	99040	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
101°			A		A	B		B	C		C	78°

Seconds of time		1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols.	A	8	16	23	31	39	47	54
	B	8	16	24	32	40	49	57
	C	0	1	1	1	2	2	2

TABLE 44.

Log. Sines, Tangents, and Secants.

12°			A		A	B		B	C		C	167°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	10 24 0	1 36 0	9. 31788	0	10. 68212	9. 32747	0	10. 67253	10. 00960	0	9. 99040	60
1	23 52	36 8	31847	1	68153	32810	1	67190	00962	0	99038	59
2	23 44	36 16	31907	2	68093	32872	2	67128	00965	0	99035	58
3	23 36	36 24	31966	3	68034	32933	3	67067	00968	0	99032	57
4	23 28	36 32	32025	4	67975	32995	4	67005	00970	0	99030	56
5	10 23 20	1 36 40	9. 32084	5	10. 67916	9. 33057	5	10. 66943	10. 00973	0	9. 99027	55
6	23 12	36 48	32143	6	67857	33119	6	66881	00976	0	99024	54
7	23 4	36 56	32202	7	67798	33180	7	66820	00978	0	99022	53
8	22 56	37 4	32261	8	67739	33242	8	66758	00981	0	99019	52
9	22 48	37 12	32319	9	67681	33303	9	66697	00984	0	99016	51
10	10 22 40	1 37 20	9. 32378	10	10. 67622	9. 33365	10	10. 66635	10. 00987	0	9. 99013	50
11	22 32	37 28	32437	10	67563	33426	11	66574	00989	1	99011	49
12	22 24	37 36	32495	11	67505	33487	12	66513	00992	1	99008	48
13	22 16	37 44	32553	12	67447	33548	13	66452	00995	1	99005	47
14	22 8	37 52	32612	13	67388	33609	14	66391	00998	1	99002	46
15	10 22 0	1 38 0	9. 32670	14	10. 67330	9. 33670	15	10. 66330	10. 01000	1	9. 99000	45
16	21 52	38 8	32728	15	67272	33731	16	66269	01003	1	98997	44
17	21 44	38 16	32786	16	67214	33792	17	66208	01006	1	98994	43
18	21 36	38 24	32844	17	67156	33853	18	66147	01009	1	98991	42
19	21 28	38 32	32902	18	67098	33913	19	66087	01011	1	98989	41
20	10 21 20	1 38 40	9. 32960	19	10. 67040	9. 33974	20	10. 66026	10. 01014	1	9. 98986	40
21	21 12	38 48	33018	20	66982	34034	21	65966	01017	1	98983	39
22	21 4	38 56	33075	21	66925	34095	22	65905	01020	1	98980	38
23	20 56	39 4	33133	22	66867	34155	23	65845	01022	1	98978	37
24	20 48	39 12	33190	23	66810	34215	24	65785	01025	1	98975	36
25	10 20 40	1 39 20	9. 33248	24	10. 66752	9. 34276	25	10. 65724	10. 01028	1	9. 98972	35
26	20 32	39 28	33305	25	66695	34336	26	65664	01031	1	98969	34
27	20 24	39 36	33362	26	66638	34396	27	65604	01033	1	98967	33
28	20 16	39 44	33420	27	66580	34456	28	65544	01036	1	98964	32
29	20 8	39 52	33477	28	66523	34516	29	65484	01039	1	98961	31
30	10 20 0	1 40 0	9. 33534	29	10. 66466	9. 34576	30	10. 65424	10. 01042	1	9. 98958	30
31	19 52	40 8	33591	29	66409	34635	31	65365	01045	1	98955	29
32	19 44	40 16	33647	30	66353	34695	32	65305	01047	1	98953	28
33	19 36	40 24	33704	31	66296	34755	33	65245	01050	2	98950	27
34	19 28	40 32	33761	32	66239	34814	34	65186	01053	2	98947	26
35	10 19 20	1 40 40	9. 33818	33	10. 66182	9. 34874	35	10. 65126	10. 01056	2	9. 98944	25
36	19 12	40 48	33874	34	66126	34933	36	65067	01059	2	98941	24
37	19 4	40 56	33931	35	66069	34992	37	65008	01062	2	98938	23
38	18 56	41 4	33987	36	66013	35051	38	64949	01064	2	98936	22
39	18 48	41 12	34043	37	65957	35111	39	64889	01067	2	98933	21
40	10 18 40	1 41 20	9. 34100	38	10. 65900	9. 35170	40	10. 64830	10. 01070	2	9. 98930	20
41	18 32	41 28	34156	39	65844	35229	41	64771	01073	2	98927	19
42	18 24	41 36	34212	40	65788	35288	42	64712	01076	2	98924	18
43	18 16	41 44	34268	41	65732	35347	43	64653	01079	2	98921	17
44	18 8	41 52	34324	42	65676	35405	44	64595	01081	2	98919	16
45	10 18 0	1 42 0	9. 34380	43	10. 65620	9. 35464	45	10. 64536	10. 01084	2	9. 98916	15
46	17 52	42 8	34436	44	65564	35523	46	64477	01087	2	98913	14
47	17 44	42 16	34491	45	65509	35581	47	64419	01090	2	98910	13
48	17 36	42 24	34547	46	65453	35640	48	64360	01093	2	98907	12
49	17 28	42 32	34602	47	65398	35698	49	64302	01096	2	98904	11
50	10 17 20	1 42 40	9. 34658	48	10. 65342	9. 35757	50	10. 64243	10. 01099	2	9. 98901	10
51	17 12	42 48	34713	48	65287	35815	51	64185	01102	2	98898	9
52	17 4	42 56	34769	49	65231	35873	52	64127	01104	2	98896	8
53	16 56	43 4	34824	50	65176	35931	53	64069	01107	2	98893	7
54	16 48	43 12	34879	51	65121	35989	54	64011	01110	3	98890	6
55	10 16 40	1 43 20	9. 34934	52	10. 65066	9. 36047	55	10. 63953	10. 01113	3	9. 98887	5
56	16 32	43 28	34989	53	65011	36105	56	63895	01116	3	98884	4
57	16 24	43 36	35044	54	64956	36163	57	63837	01119	3	98881	3
58	16 16	43 44	35099	55	64901	36221	58	63779	01122	3	98878	2
59	16 8	43 52	35154	56	64846	36279	59	63721	01125	3	98875	1
60	16 0	44 0	35209	57	64791	36336	60	63664	01128	3	98872	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
102°			A		A	B		B	C		C	77°

Seconds of time		1^s	2^s	3^s	4^s	5^s	6^s	7^s
Prop. parts of cols.	A	7	14	21	29	36	43	50
	B	7	15	22	30	37	45	52
	C	0	1	1	1	2	2	2

TABLE 44.

Log. Sines, Tangents, and Secants.

13°			A		A	B		B	C		C	166°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	10 16 0	1 44 0	9. 35209	0	10. 64791	9. 36336	0	10. 63664	10. 01128	0	9. 98872	60
1	15 52	44 8	35263	1	64737	36394	1	63606	01131	0	98869	59
2	15 44	44 16	35318	2	64682	36452	2	63548	01133	0	98867	58
3	15 36	44 24	35373	3	64627	36509	3	63491	01136	0	98864	57
4	15 28	44 32	35427	4	64573	36566	4	63434	01139	0	98861	56
5	10 15 20	1 44 40	9. 35481	4	10. 64519	9. 36624	5	10. 63376	10. 01142	0	9. 98858	55
6	15 12	44 48	35536	5	64464	36681	6	63319	01145	0	98855	54
7	15 4	44 56	35590	6	64410	36738	6	63262	01148	0	98852	53
8	14 56	45 4	35644	7	64356	36795	7	63205	01151	0	98849	52
9	14 48	45 12	35698	8	64302	36852	8	63148	01154	0	98846	51
10	10 14 40	1 45 20	9. 35752	9	10. 64248	9. 36909	9	10. 63091	10. 01157	1	9. 98843	50
11	14 32	45 28	35806	10	64194	36966	10	63034	01160	1	98840	49
12	14 24	45 36	35860	11	64140	37023	11	62977	01163	1	98837	48
13	14 16	45 44	35914	11	64086	37080	12	62920	01166	1	98834	47
14	14 8	45 52	35968	12	64032	37137	13	62863	01169	1	98831	46
15	10 14 0	1 46 0	9. 36022	13	10. 63978	9. 37193	14	10. 62807	10. 01172	1	9. 98828	45
16	13 52	46 8	36075	14	63925	37250	15	62750	01175	1	98825	44
17	13 44	46 16	36129	15	63871	37306	16	62694	01178	1	98822	43
18	13 36	46 24	36182	16	63818	37363	17	62637	01181	1	98819	42
19	13 28	46 32	36236	17	63764	37419	18	62581	01184	1	98816	41
20	10 13 20	1 46 40	9. 36289	18	10. 63711	9. 37476	19	10. 62524	10. 01187	1	9. 98813	40
21	13 12	46 48	36342	18	63658	37532	19	62468	01190	1	98810	39
22	13 4	46 56	36395	19	63605	37588	20	62412	01193	1	98807	38
23	12 56	47 4	36449	20	63551	37644	21	62356	01196	1	98804	37
24	12 48	47 12	36502	21	63498	37700	22	62300	01199	1	98801	36
25	10 12 40	1 47 20	9. 36555	22	10. 63445	9. 37756	23	10. 62244	10. 01202	1	9. 98798	35
26	12 32	47 28	36608	23	63392	37812	24	62188	01205	1	98795	34
27	12 24	47 36	36660	24	63340	37868	25	62132	01208	1	98792	33
28	12 16	47 44	36713	25	63287	37924	26	62076	01211	1	98789	32
29	12 8	47 52	36766	25	63234	37980	27	62020	01214	1	98786	31
30	10 12 0	1 48 0	9. 36819	26	10. 63181	9. 38035	28	10. 61965	10. 01217	2	9. 98783	30
31	11 52	48 8	36871	27	63129	38091	29	61909	01220	2	98780	29
32	11 44	48 16	36924	28	63076	38147	30	61853	01223	2	98777	28
33	11 36	48 24	36976	29	63024	38202	31	61798	01226	2	98774	27
34	11 28	48 32	37028	30	62972	38257	32	61743	01229	2	98771	26
35	10 11 20	1 48 40	9. 37081	31	10. 62919	9. 38313	32	10. 61687	10. 01232	2	9. 98768	25
36	11 12	48 48	37133	32	62867	38368	33	61632	01235	2	98765	24
37	11 4	48 56	37185	32	62815	38423	34	61577	01238	2	98762	23
38	10 56	49 4	37237	33	62763	38479	35	61521	01241	2	98759	22
39	10 48	49 12	37289	34	62711	38534	36	61466	01244	2	98756	21
40	10 10 40	1 49 20	9. 37341	35	10. 62659	9. 38589	37	10. 61411	10. 01247	2	9. 98753	20
41	10 32	49 28	37393	36	62607	38644	38	61356	01250	2	98750	19
42	10 24	49 36	37445	37	62555	38699	39	61301	01254	2	98746	18
43	10 16	49 44	37497	38	62503	38754	40	61246	01257	2	98743	17
44	10 8	49 52	37549	39	62451	38808	41	61192	01260	2	98740	16
45	10 10 0	1 50 0	9. 37600	39	10. 62400	9. 38863	42	10. 61137	10. 01263	2	9. 98737	15
46	9 52	50 8	37652	40	62348	38918	43	61082	01266	2	98734	14
47	9 44	50 16	37703	41	62297	38972	44	61028	01269	2	98731	13
48	9 36	50 24	37755	42	62245	39027	45	60973	01272	2	98728	12
49	9 28	50 32	37806	43	62194	39082	45	60918	01275	2	98725	11
50	10 9 20	1 50 40	9. 37858	44	10. 62142	9. 39136	46	10. 60864	10. 01278	3	9. 98722	10
51	9 12	50 48	37909	45	62091	39190	47	60810	01281	3	98719	9
52	9 4	50 56	37960	46	62040	39245	48	60755	01285	3	98715	8
53	8 56	51 4	38011	47	61989	39299	49	60701	01288	3	98712	7
54	8 48	51 12	38062	47	61938	39353	50	60647	01291	3	98709	6
55	10 8 40	1 51 20	9. 38113	48	10. 61887	9. 39407	51	10. 60593	10. 01294	3	9. 98706	5
56	8 32	51 28	38164	49	61836	39461	52	60539	01297	3	98703	4
57	8 24	51 36	38215	50	61785	39515	53	60485	01300	3	98700	3
58	8 16	51 44	38266	51	61734	39569	54	60431	01303	3	98697	2
59	8 8	51 52	38317	52	61683	39623	55	60377	01306	3	98694	1
60	8 0	52 0	38368	53	61632	39677	56	60323	01310	3	98690	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
103°			A		A	B		B	C		C	76°

Seconds of time		1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols.	A	7	13	20	26	33	39	46
	B	7	14	21	28	35	42	49
	C	0	1	1	2	2	2	3

TABLE 44.

Log. Sines, Tangents, and Secants.

14°			A		A	B		B	C		C	165°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	10 8 0	1 52 0	9. 38368	0	10. 61632	9. 39677	0	10. 60323	10. 01310	0	9. 98690	60
1	7 52	52 8	38418	1	61582	39731	1	60269	01313	0	98687	59
2	7 44	52 16	38469	2	61531	39785	2	60215	01316	0	98684	58
3	7 36	52 24	38519	2	61481	39838	3	60162	01319	0	98681	57
4	7 28	52 32	38570	3	61430	39892	3	60108	01322	0	98678	56
5	10 7 20	1 52 40	38620	4	10. 61380	9. 39945	4	10. 60055	10. 01325	0	9. 98675	55
6	7 12	52 48	38670	5	61330	39999	5	60001	01329	0	98671	54
7	7 4	52 56	38721	6	61279	40052	6	59948	01332	0	98668	53
8	6 56	53 4	38771	7	61229	40106	7	59894	01335	0	98665	52
9	6 48	53 12	38821	7	61179	40159	8	59841	01338	0	98662	51
10	10 6 40	1 53 20	9. 38871	8	10. 61129	9. 40212	9	10. 59788	10. 01341	1	9. 98659	50
11	6 32	53 28	38921	9	61079	40266	10	59734	01344	1	98656	49
12	6 24	53 36	38971	10	61029	40319	10	59681	01348	1	98652	48
13	6 16	53 44	39021	11	60979	40372	11	59628	01351	1	98649	47
14	6 8	53 52	39071	11	60929	40425	12	59575	01354	1	98646	46
15	10 6 0	1 54 0	9. 39121	12	10. 60879	9. 40478	13	10. 59522	10. 01357	1	9. 98643	45
16	5 52	54 8	39170	13	60830	40531	14	59469	01360	1	98640	44
17	5 44	54 16	39220	14	60780	40584	15	59416	01364	1	98636	43
18	5 36	54 24	39270	15	60730	40636	16	59364	01367	1	98633	42
19	5 28	54 32	39319	15	60681	40689	17	59311	01370	1	98630	41
20	10 5 20	1 54 40	9. 39369	16	10. 60631	9. 40742	17	10. 59258	10. 01373	1	9. 98627	40
21	5 12	54 48	39418	17	60582	40795	18	59205	01377	1	98623	39
22	5 4	54 56	39467	18	60533	40847	19	59153	01380	1	98620	38
23	4 56	55 4	39517	19	60483	40900	20	59100	01383	1	98617	37
24	4 48	55 12	39566	20	60434	40952	21	59048	01386	1	98614	36
25	10 4 40	1 55 20	9. 39615	20	10. 60385	9. 41005	22	10. 58995	10. 01390	1	9. 98610	35
26	4 32	55 28	39664	21	60336	41057	23	58943	01393	1	98607	34
27	4 24	55 36	39713	22	60287	41109	23	58891	01396	1	98604	33
28	4 16	55 44	39762	23	60238	41161	24	58839	01399	2	98601	32
29	4 8	55 52	39811	24	60189	41214	25	58786	01403	2	98597	31
30	10 4 0	1 56 0	9. 39860	24	10. 60140	9. 41266	26	10. 58734	10. 01406	2	9. 98594	30
31	3 52	56 8	39909	25	60091	41318	27	58682	01409	2	98591	29
32	3 44	56 16	39958	26	60042	41370	28	58630	01412	2	98588	28
33	3 36	56 24	40006	27	59994	41422	29	58578	01416	2	98584	27
34	3 28	56 32	40055	28	59945	41474	30	58526	01419	2	98581	26
35	10 3 20	1 56 40	9. 40103	29	10. 59897	9. 41526	30	10. 58474	01422	2	9. 98578	25
36	3 12	56 48	40152	29	59848	41578	31	58422	01426	2	98574	24
37	3 4	56 56	40200	30	59800	41629	32	58371	01429	2	98571	23
38	2 56	57 4	40249	31	59751	41681	33	58319	01432	2	98568	22
39	2 48	57 12	40297	32	59703	41733	34	58267	01435	2	98565	21
40	10 2 40	1 57 20	9. 40346	33	10. 59654	9. 41784	35	10. 58216	10. 01439	2	9. 98561	20
41	2 32	57 28	40394	33	59606	41836	36	58164	01442	2	98558	19
42	2 24	57 36	40442	34	59558	41887	36	58113	01445	2	98555	18
43	2 16	57 44	40490	35	59510	41939	37	58061	01449	2	98551	17
44	2 8	57 52	40538	36	59462	41990	38	58010	01452	2	98548	16
45	10 2 0	1 58 0	9. 40586	37	10. 59414	9. 42041	39	10. 57959	10. 01455	2	9. 98545	15
46	1 52	58 8	40634	37	59366	42093	40	57907	01459	3	98541	14
47	1 44	58 16	40682	38	59318	42144	41	57856	01462	3	98538	13
48	1 36	58 24	40730	39	59270	42195	42	57805	01465	3	98535	12
49	1 28	58 32	40778	40	59222	42246	43	57754	01469	3	98531	11
50	10 1 20	1 58 40	9. 40825	41	10. 59175	9. 42297	43	10. 57703	10. 01472	3	9. 98528	10
51	1 12	58 48	40873	42	59127	42348	44	57652	01475	3	98525	9
52	1 4	58 56	40921	42	59079	42399	45	57601	01479	3	98521	8
53	0 56	59 4	40968	43	59032	42450	46	57550	01482	3	98518	7
54	0 48	59 12	41016	44	58984	42501	47	57499	01485	3	98515	6
55	10 0 40	1 59 20	9. 41063	45	10. 58937	9. 42552	48	10. 57448	10. 01489	3	9. 98511	5
56	0 32	59 28	41111	46	58889	42603	49	57397	01492	3	98508	4
57	0 24	59 36	41158	46	58842	42653	50	57347	01495	3	98505	3
58	0 16	59 44	41205	47	58795	42704	50	57296	01499	3	98501	2
59	0 8	59 52	41252	48	58748	42755	51	57245	01502	3	98498	1
60	0 0	2 0 0	41300	49	58700	42805	52	57195	01506	3	98494	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
104°			A		A	B		B	C		C	75°

Seconds of time		1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols.	A	6	12	18	24	31	37	43
	B	7	13	20	26	33	39	46
	C	0	1	1	2	2	2	3

TABLE 44.

Log. Sines, Tangents, and Secants.

15°			A		A	B		B	C		C	164°
M.	**Hour A. M.**	**Hour P. M.**	**Sine.**	**Diff.**	**Cosecant.**	**Tangent.**	**Diff.**	**Cotangent.**	**Secant.**	**Diff.**	**Cosine.**	**M.**
0	10 0 0	2 0 0	9.41300	0	10.58700	9.42805	0	10.57195	10.01506	0	9.98494	60
1	9 59 52	0 8	41347	1	58653	42856	1	57144	01509	0	98491	59
2	59 44	0 16	41394	2	58606	42906	2	57094	01512	0	98488	58
3	59 36	0 24	41441	2	58559	42957	2	57043	01516	0	98484	57
4	59 28	0 32	41488	3	58512	43007	3	56993	01519	0	98481	56
5	9 59 20	2 0 40	9.41535	4	10.58465	9.43057	4	10.56943	10.01523	0	9.98477	55
6	59 12	0 48	41582	5	58418	43108	5	56892	01526	0	98474	54
7	59 4	0 56	41628	5	58372	43158	6	56842	01529	0	98471	53
8	58 56	1 4	41675	6	58325	43208	7	56792	01533	0	98467	52
9	58 48	1 12	41722	7	58278	43258	7	56742	01536	1	98464	51
10	9 58 40	2 1 20	9.41768	8	10.58232	9.43308	8	10.56692	10.01540	1	9.98460	50
11	58 32	1 28	41815	8	58185	43358	9	56642	01543	1	98457	49
12	58 24	1 36	41861	9	58139	43408	10	56592	01547	1	98453	48
13	58 16	1 44	41908	10	58092	43458	11	56542	01550	1	98450	47
14	58 8	1 52	41954	11	58046	43508	11	56492	01553	1	98447	46
15	9 58 0	2 2 0	9.42001	11	10.57999	9.43558	12	10.56442	10.01557	1	9.98443	45
16	57 52	2 8	42047	12	57953	43607	13	56393	01560	1	98440	44
17	57 44	2 16	42093	13	57907	43657	14	56343	01564	1	98436	43
18	57 36	2 24	42140	14	57860	43707	15	56293	01567	1	98433	42
19	57 28	2 32	42186	14	57814	43756	16	56244	01571	1	98429	41
20	9 57 20	2 2 40	9.42232	15	10.57768	9.43806	16	10.56194	10.01574	1	9.98426	40
21	57 12	2 48	42278	16	57722	43855	17	56145	01578	1	98422	39
22	57 4	2 56	42324	17	57676	43905	18	56095	01581	1	98419	38
23	56 56	3 4	42370	17	57630	43954	19	56046	01585	1	98415	37
24	56 48	3 12	42416	18	57584	44004	20	55996	01588	1	98412	36
25	9 56 40	2 3 20	9.42461	19	10.57539	9.44053	20	10.55947	10.01591	1	9.98409	35
26	56 32	3 28	42507	20	57493	44102	21	55898	01595	2	98405	34
27	56 24	3 36	42553	21	57447	44151	22	55849	01598	2	98402	33
28	56 16	3 44	42599	21	57401	44201	23	55799	01602	2	98398	32
29	56 8	3 52	42644	22	57356	44250	24	55750	01605	2	98395	31
30	9 56 0	2 4 0	9.42690	23	10.57310	9.44299	25	10.55701	10.01609	2	9.98391	30
31	55 52	4 8	42735	24	57265	44348	25	55652	01612	2	98388	29
32	55 44	4 16	42781	24	57219	44397	26	55603	01616	2	98384	28
33	55 36	4 24	42826	25	57174	44446	27	55554	01619	2	98381	27
34	55 28	4 32	42872	26	57128	44495	28	55505	01623	2	98377	26
35	9 55 20	2 4 40	9.42917	27	10.57083	9.44544	29	10.55456	10.01627	2	9.98373	25
36	55 12	4 48	42962	27	57038	44592	29	55408	01630	2	98370	24
37	55 4	4 56	43008	28	56992	44641	30	55359	01634	2	98366	23
38	54 56	5 4	43053	29	56947	44690	31	55310	01637	2	98363	22
39	54 48	5 12	43098	30	56902	44738	32	55262	01641	2	98359	21
40	9 54 40	2 5 20	9.43143	30	10.56857	9.44787	33	10.55213	10.01644	2	9.98356	20
41	54 32	5 28	43188	31	56812	44836	34	55164	01648	2	98352	19
42	54 24	5 36	43233	32	56767	44884	34	55116	01651	2	98349	18
43	54 16	5 44	43278	33	56722	44933	35	55067	01655	3	98345	17
44	54 8	5 52	43323	33	56677	44981	36	55019	01658	3	98342	16
45	9 54 0	2 6 0	9.43367	34	10.56633	9.45029	37	10.54971	10.01662	3	9.98338	15
46	53 52	6 8	43412	35	56588	45078	38	54922	01666	3	98334	14
47	53 44	6 16	43457	36	56543	45126	38	54874	01669	3	98331	13
48	53 36	6 24	43502	36	56498	45174	39	54826	01673	3	98327	12
49	53 28	6 32	43546	37	56454	45222	40	54778	01676	3	98324	11
50	9 53 20	2 6 40	9.43591	38	10.56409	9.45271	41	10.54729	10.01680	3	9.98320	10
51	53 12	6 48	43635	39	56365	45319	42	54681	01683	3	98317	9
52	53 4	6 56	43680	39	56320	45367	43	54633	01687	3	98313	8
53	52 56	7 4	43724	40	56276	45415	43	54585	01691	3	98309	7
54	52 48	7 12	43769	41	56231	45463	44	54537	01694	3	98306	6
55	9 52 40	2 7 20	9.43813	42	10.56187	9.45511	45	10.54489	10.01698	3	9.98302	5
56	52 32	7 28	43857	43	56143	45559	46	54441	01701	3	98299	4
57	52 24	7 36	43901	43	56099	45606	47	54394	01705	3	98295	3
58	52 16	7 44	43946	44	56054	45654	47	54346	01709	3	98291	2
59	52 8	7 52	43990	45	56010	45702	48	54298	01712	3	98288	1
60	52 0	8 0	44034	46	55966	45750	49	54250	01716	4	98284	0
M.	**Hour P. M.**	**Hour A. M.**	**Cosine.**	**Diff.**	**Secant.**	**Cotangent.**	**Diff.**	**Tangent.**	**Cosecant.**	**Diff.**	**Sine.**	**M.**
105°			A		A	B		B	C		C	74°

Seconds of time		1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols.	A	6	11	17	23	28	34	40
	B	6	12	18	25	31	37	43
	C	0	1	1	2	2	3	3

TABLE 44.

Log. Sines, Tangents, and Secants.

16°			A		A	B		B	C		C	163°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	9 52 0	2 8 0	9. 44034	0	10. 55966	9. 45750	0	10. 54250	10. 01716	0	9. 98284	60
1	51 52	8 8	44078	1	55922	45797	1	54203	01719	0	98281	59
2	51 44	8 16	44122	1	55878	45845	2	54155	01723	0	98277	58
3	51 36	8 24	44166	2	55834	45892	2	54108	01727	0	98273	57
4	51 28	8 32	44210	3	55790	45940	3	54060	01730	0	98270	56
5	9 51 20	2 8 40	9. 44253	4	10. 55747	9. 45987	4	10. 54013	10. 01734	0	9. 98266	55
6	51 12	8 48	44297	4	55703	46035	5	53965	01738	0	98262	54
7	51 4	8 56	44341	5	55659	46082	5	53918	01741	0	98259	53
8	50 56	9 4	44385	6	55615	46130	6	53870	01745	0	98255	52
9	50 48	9 12	44428	6	55572	46177	7	53823	01749	1	98251	51
10	9 50 40	2 9 20	9. 44472	7	10. 55528	9. 46224	8	10. 53776	10. 01752	1	9. 98248	50
11	50 32	9 28	44516	8	55484	46271	9	53729	01756	1	98244	49
12	50 24	9 36	44559	9	55441	46319	9	53681	01760	1	98240	48
13	50 16	9 44	44602	9	55398	46366	10	53634	01763	1	98237	47
14	50 8	9 52	44646	10	55354	46413	11	53587	01767	1	98233	46
15	9 50 0	2 10 0	9. 44689	11	10. 55311	9. 46460	12	10. 53540	10. 01771	1	9. 98229	45
16	49 52	10 8	44733	11	55267	46507	12	53493	01774	1	98226	44
17	49 44	10 16	44776	12	55224	46554	13	53446	01778	1	98222	43
18	49 36	10 24	44819	13	55181	46601	14	53399	01782	1	98218	42
19	49 28	10 32	44862	14	55138	46648	15	53352	01785	1	98215	41
20	9 49 20	2 10 40	9. 44905	14	10. 55095	9. 46694	15	10. 53306	10. 01789	1	9. 98211	40
21	49 12	10 48	44948	15	55052	46741	16	53259	01793	1	98207	39
22	49 4	10 56	44992	16	55008	46788	17	53212	01796	1	98204	38
23	48 56	11 4	45035	16	54965	46835	18	53165	01800	1	98200	37
24	48 48	11 12	45077	17	54923	46881	19	53119	01804	1	98196	36
25	9 48 40	2 11 20	9. 45120	18	10. 54880	9. 46928	19	10. 53072	10. 01808	2	9. 98192	35
26	48 32	11 28	45163	18	54837	46975	20	53025	01811	2	98189	34
27	48 24	11 36	45206	19	54794	47021	21	52979	01815	2	98185	33
28	48 16	11 44	45249	20	54751	47068	22	52932	01819	2	98181	32
29	48 8	11 52	45292	21	54708	47114	22	52886	01823	2	98177	31
30	9 48 0	2 12 0	9. 45334	21	10. 54666	9. 47160	23	10. 52840	10. 01826	2	9. 98174	30
31	47 52	12 8	45377	22	54623	47207	24	52793	01830	2	98170	29
32	47 44	12 16	45419	23	54581	47253	25	52747	01834	2	98166	28
33	47 36	12 24	45462	23	54538	47299	26	52701	01838	2	98162	27
34	47 28	12 32	45504	24	54496	47346	26	52654	01841	2	98159	26
35	9 47 20	2 12 40	9. 45547	25	10. 54453	9. 47392	27	10. 52608	10. 01845	2	9. 98155	25
36	47 12	12 48	45589	26	54411	47438	28	52562	01849	2	98151	24
37	47 4	12 56	45632	26	54368	47484	29	52516	01853	2	98147	23
38	46 56	13 4	45674	27	54326	47530	29	52470	01856	2	98144	22
39	46 48	13 12	45716	28	54284	47576	30	52424	01860	2	98140	21
40	9 46 40	2 13 20	9. 45758	28	10. 54242	9. 47622	31	10. 52378	10. 01864	2	9. 98136	20
41	46 32	13 28	45801	29	54199	47668	32	52332	01868	3	98132	19
42	46 24	13 36	45843	30	54157	47714	32	52286	01871	3	98129	18
43	46 16	13 44	45885	31	54115	47760	33	52240	01875	3	98125	17
44	46 8	13 52	45927	31	54073	47806	34	52194	01879	3	98121	16
45	9 46 0	2 14 0	9. 45969	32	10. 54031	9. 47852	35	10. 52148	10. 01883	3	9. 98117	15
46	45 52	14 8	46011	33	53989	47897	36	52103	01887	3	98113	14
47	45 44	14 16	46053	33	53947	47943	36	52057	01890	3	98110	13
48	45 36	14 24	46095	34	53905	47989	37	52011	01894	3	98106	12
49	45 28	14 32	46136	35	53864	48035	38	51965	01898	3	98102	11
50	9 45 20	2 14 40	9. 46178	36	10. 53822	9. 48080	39	10. 51920	10. 01902	3	9. 98098	10
51	45 12	14 48	46220	36	53780	48126	39	51874	01906	3	98094	9
52	45 4	14 56	46262	37	53738	48171	40	51829	01910	3	98090	8
53	44 56	15 4	46303	38	53697	48217	41	51783	01913	3	98087	7
54	44 48	15 12	46345	38	53655	48262	42	51738	01917	3	98083	6
55	9 44 40	2 15 20	9. 46386	39	10. 53614	9. 48307	43	10. 51693	10. 01921	3	9. 98079	5
56	44 32	15 28	46428	40	53572	48353	43	51647	01925	3	98075	4
57	44 24	15 36	46469	41	53531	48398	44	51602	01929	4	98071	3
58	44 16	15 44	46511	41	53489	48443	45	51557	01933	4	98067	2
59	44 8	15 52	46552	42	53448	48489	46	51511	01937	4	98063	1
60	44 0	16 0	46594	43	53406	48534	46	51466	01940	4	98060	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
106°			A		A	B		B	C		C	73°

Seconds of time		1^{s}	2^{s}	3^{s}	4^{s}	5^{s}	6^{s}	7^{s}
Prop. parts of cols.	A	5	11	16	21	27	32	37
	B	6	12	17	23	29	35	41
	C	0	1	1	2	2	3	3

TABLE 44.

Log. Sines, Tangents, and Secants.

17°			A		A	B		B	C		C	162°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	9 44 0	2 16 0	9.46594	0	10.53406	9.48534	0	10.51466	10.01940	0	9.98060	60
1	43 52	16 8	46635	1	53365	48579	1	51421	01944	0	98056	59
2	43 44	16 16	46676	1	53324	48624	1	51376	01948	0	98052	58
3	43 36	16 24	46717	2	53283	48669	2	51331	01952	0	98048	57
4	43 28	16 32	46758	3	53242	48714	3	51286	01956	0	98044	56
5	9 43 20	2 16 40	9.46800	3	10.53200	9.48759	4	10.51241	10.01960	0	9.98040	55
6	43 12	16 48	46841	4	53159	48804	4	51196	01964	0	98036	54
7	43 4	16 56	46882	5	53118	48849	5	51151	01968	0	98032	53
8	42 56	17 4	46923	5	53077	48894	6	51106	01971	1	98029	52
9	42 48	17 12	46964	6	53036	48939	7	51061	01975	1	98025	51
10	9 42 40	2 17 20	9.47005	7	10.52995	9.48984	7	10.51016	10.01979	1	9.98021	50
11	42 32	17 28	47045	7	52955	49029	8	50971	01983	1	98017	49
12	42 24	17 36	47086	8	52914	49073	9	50927	01987	1	98013	48
13	42 16	17 44	47127	9	52873	49118	10	50882	01991	1	98009	47
14	42 8	17 52	47168	9	52832	49163	10	50837	01995	1	98005	46
15	9 42 0	2 18 0	9.47209	10	10.52791	9.49207	11	10.50793	10.01999	1	9.98001	45
16	41 52	18 8	47249	11	52751	49252	12	50748	02003	1	97997	44
17	41 44	18 16	47290	11	52710	49296	12	50704	02007	1	97993	43
18	41 36	18 24	47330	12	52670	49341	13	50659	02011	1	97989	42
19	41 28	18 32	47371	13	52629	49385	14	50615	02014	1	97986	41
20	9 41 20	2 18 40	9.47411	13	10.52589	9.49430	15	10.50570	10.02018	1	9.97982	40
21	41 12	18 48	47452	14	52548	49474	15	50526	02022	1	97978	39
22	41 4	18 56	47492	15	52508	49519	16	50481	02026	1	97974	38
23	40 56	19 4	47533	15	52467	49563	17	50437	02030	2	97970	37
24	40 48	19 12	47573	16	52427	49607	18	50393	02034	2	97966	36
25	9 40 40	2 19 20	9.47613	17	10.52387	9.49652	18	10.50348	10.02038	2	9.97962	35
26	40 32	19 28	47654	17	52346	49696	19	50304	02042	2	97958	34
27	40 24	19 36	47694	18	52306	49740	20	50260	02046	2	97954	33
28	40 16	19 44	47734	19	52266	49784	21	50216	02050	2	97950	32
29	40 8	19 52	47774	19	52226	49828	21	50172	02054	2	97946	31
30	9 40 0	2 20 0	9.47814	20	10.52186	9.49872	22	10.50128	10.02058	2	9.97942	30
31	39 52	20 8	47854	21	52146	49916	23	50084	02062	2	97938	29
32	39 44	20 16	47894	21	52106	49960	24	50040	02066	2	97934	28
33	39 36	20 24	47934	22	52066	50004	24	49996	02070	2	97930	27
34	39 28	20 32	47974	23	52026	50048	25	49952	02074	2	97926	26
35	9 39 20	2 20 40	9.48014	23	10.51986	9.50092	26	10.49908	10.02078	2	9.97922	25
36	39 12	20 48	48054	24	51946	50136	26	49864	02082	2	97918	24
37	39 4	20 56	48094	25	51906	50180	27	49820	02086	2	97914	23
38	38 56	21 4	48133	25	51867	50223	28	49777	02090	3	97910	22
39	38 48	21 12	48173	26	51827	50267	29	49733	02094	3	97906	21
40	9 38 40	2 21 20	9.48213	27	10.51787	9.50311	29	10.49689	10.02098	3	9.97902	20
41	38 32	21 28	48252	27	51748	50355	30	49645	02102	3	97898	19
42	38 24	21 36	48292	28	51708	50398	31	49602	02106	3	97894	18
43	38 16	21 44	48332	29	51668	50442	32	49558	02110	3	97890	17
44	38 8	21 52	48371	29	51629	50485	32	49515	02114	3	97886	16
45	9 38 0	2 22 0	9.48411	30	10.51589	9.50529	33	10.49471	10.02118	3	9.97882	15
46	37 52	22 8	48450	31	51550	50572	34	49428	02122	3	97878	14
47	37 44	22 16	48490	31	51510	50616	35	49384	02126	3	97874	13
48	37 36	22 24	48529	32	51471	50659	35	49341	02130	3	97870	12
49	37 28	22 32	48568	33	51432	50703	36	49297	02134	3	97866	11
50	9 37 20	2 22 40	9.48607	33	10.51393	9.50746	37	10.49254	10.02139	3	9.97861	10
51	37 12	22 48	48647	34	51353	50789	37	49211	02143	3	97857	9
52	37 4	22 56	48686	35	51314	50833	38	49167	02147	3	97853	8
53	36 56	23 4	48725	35	51275	50876	39	49124	02151	4	97849	7
54	36 48	23 12	48764	36	51236	50919	40	49081	02155	4	97845	6
55	9 36 40	2 23 20	9.48803	37	10.51197	9.50962	40	10.49038	10.02159	4	9.97841	5
56	36 32	23 28	48842	37	51158	51005	41	48995	02163	4	97837	4
57	36 24	23 36	48881	38	51119	51048	42	48952	02167	4	97833	3
58	36 16	23 44	48920	39	51080	51092	43	48908	02171	4	97829	2
59	36 8	23 52	48959	39	51041	51135	43	48865	02175	4	97825	1
60	36 0	24 0	48998	40	51002	51178	44	48822	02179	4	97821	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
107°			A		A	B		B	C		C	72°

Seconds of time		1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols.	A	5	10	15	20	25	30	35
	B	6	11	17	22	28	33	39
	C	0	1	1	2	2	3	3

TABLE 44.

Log. Sines, Tangents, and Secants.

18°			A		A	B		B	C		C	161°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	9 36 0	2 24 0	9.48998	0	10.51002	9.51178	0	10.48822	10.02179	0	9.97821	60
1	35 52	24 8	49037	1	50963	51221	1	48779	02183	0	97817	59
2	35 44	24 16	49076	1	50924	51264	1	48736	02188	0	97812	58
3	35 36	24 24	49115	2	50885	51306	2	48694	02192	0	97808	57
4	35 28	24 32	49153	3	50847	51349	3	48651	02196	0	97804	56
5	9 35 20	2 24 40	9.49192	3	10.50808	9.51392	3	10.48608	10.02200	0	9.97800	55
6	35 12	24 48	49231	4	50769	51435	4	48565	02204	0	97796	54
7	35 4	24 56	49269	4	50731	51478	5	48522	02208	0	97792	53
8	34 56	25 4	49308	5	50692	51520	6	48480	02212	1	97788	52
9	34 48	25 12	49347	6	50653	51563	6	48437	02216	1	97784	51
10	9 34 40	2 25 20	9.49385	6	10.50615	9.51606	7	10.48394	10.02221	1	9.97779	50
11	34 32	25 28	49424	7	50576	51648	8	48352	02225	1	97775	49
12	34 24	25 36	49462	8	50538	51691	8	48309	02229	1	97771	48
13	34 16	25 44	49500	8	50500	51734	9	48266	02233	1	97767	47
14	34 8	25 52	49539	9	50461	51776	10	48224	02237	1	97763	46
15	9 34 0	2 26 0	9.49577	9	10.50423	9.51819	10	10.48181	10.02241	1	9.97759	45
16	33 52	26 8	49615	10	50385	51861	11	48139	02246	1	97754	44
17	33 44	26 16	49654	11	50346	51903	12	48097	02250	1	97750	43
18	33 36	26 24	49692	11	50308	51946	13	48054	02254	1	97746	42
19	33 28	26 32	49730	12	50270	51988	13	48012	02258	1	97742	41
20	9 33 20	2 26 40	9.49768	13	10.50232	9.52031	14	10.47969	10.02262	1	9.97738	40
21	33 12	26 48	49806	13	50194	52073	15	47927	02266	1	97734	39
22	33 4	26 56	49844	14	50156	52115	15	47885	02271	2	97729	38
23	32 56	27 4	49882	14	50118	52157	16	47843	02275	2	97725	37
24	32 48	27 12	49920	15	50080	52200	17	47800	02279	2	97721	36
25	9 32 40	2 27 20	9.49958	16	10.50042	9.52242	17	10.47758	10.02283	2	9.97717	35
26	32 32	27 28	49996	16	50004	52284	18	47716	02287	2	97713	34
27	32 24	27 36	50034	17	49966	52326	19	47674	02292	2	97708	33
28	32 16	27 44	50072	18	49928	52368	20	47632	02296	2	97704	32
29	32 8	27 52	50110	18	49890	52410	20	47590	02300	2	97700	31
30	9 32 0	2 28 0	9.50148	19	10.49852	9.52452	21	10.47548	10.02304	2	9.97696	30
31	31 52	28 8	50185	20	49815	52494	22	47506	02309	2	97691	29
32	31 44	28 16	50223	20	49777	52536	22	47464	02313	2	97687	28
33	31 36	28 24	50261	21	49739	52578	23	47422	02317	2	97683	27
34	31 28	28 32	50298	21	49702	52620	24	47380	02321	2	97679	26
35	9 31 20	2 28 40	9.50336	22	10.49664	9.52661	24	10.47339	10.02326	2	9.97674	25
36	31 12	28 48	50374	23	49626	52703	25	47297	02330	3	97670	24
37	31 4	28 56	50411	23	49589	52745	26	47255	02334	3	97666	23
38	30 56	29 4	50449	24	49551	52787	27	47213	02338	3	97662	22
39	30 48	29 12	50486	25	49514	52829	27	47171	02343	3	97657	21
40	9 30 40	2 29 20	9.50523	25	10.49477	9.52870	28	10.47130	10.02347	3	9.97653	20
41	30 32	29 28	50561	26	49439	52912	29	47088	02351	3	97649	19
42	30 24	29 36	50598	26	49402	52953	29	47047	02355	3	97645	18
43	30 16	29 44	50635	27	49365	52995	30	47005	02360	3	97640	17
44	30 8	29 52	50673	28	49327	53037	31	46963	02364	3	97636	16
45	9 30 0	2 30 0	9.50710	28	10.49290	9.53078	31	10.46922	10.02368	3	9.97632	15
46	29 52	30 8	50747	29	49253	53120	32	46880	02372	3	97628	14
47	29 44	30 16	50784	30	49216	53161	33	46839	02377	3	97623	13
48	29 36	30 24	50821	30	49179	53202	34	46798	02381	3	97619	12
49	29 28	30 32	50858	31	49142	53244	34	46756	02385	3	97615	11
50	9 29 20	2 30 40	9.50896	31	10.49104	9.53285	35	10.46715	10.02390	4	9.97610	10
51	29 12	30 48	50933	32	49067	53327	36	46673	02394	4	97606	9
52	29 4	30 56	50970	33	49030	53368	36	46632	02398	4	97602	8
53	28 56	31 4	51007	33	48993	53409	37	46591	02403	4	97597	7
54	28 48	31 12	51043	34	48957	53450	38	46550	02407	4	97593	6
55	9 28 40	2 31 20	9.51080	35	10.48920	9.53492	38	10.46508	10.02411	4	9.97589	5
56	28 32	31 28	51117	35	48883	53533	39	46467	02416	4	97584	4
57	28 24	31 36	51154	36	48846	53574	40	46426	02420	4	97580	3
58	28 16	31 44	51191	37	48809	53615	41	46385	02424	4	97576	2
59	28 8	31 52	51227	37	48773	53656	41	46344	02429	4	97571	1
60	28 0	32 0	51264	38	48736	53697	42	46303	02433	4	97567	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
108°			A		A	B		B	C		C	71°

Seconds of time		1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols.	A	5	9	14	19	24	28	33
	B	5	10	16	21	26	31	37
	C	1	1	2	2	3	3	4

TABLE 44.

Log. Sines, Tangents, and Secants.

19°			A		A	B		B	C		C	160°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	9 28 0	2 32 0	9.51264	0	10.48736	9.53697	0	10.46303	10.02433	0	9.97567	60
1	27 52	32 8	51301	1	48699	53738	1	46262	02437	0	97563	59
2	27 44	32 16	51338	1	48662	53779	1	46221	02442	0	97558	58
3	27 36	32 24	51374	2	48626	53820	2	46180	02446	0	97554	57
4	27 28	32 32	51411	2	48589	53861	3	46139	02450	0	97550	56
5	9 27 20	2 32 40	9.51447	3	10.48553	9.53902	3	10.46098	10.02455	0	9.97545	55
6	27 12	32 48	51484	4	48516	53943	4	46057	02459	0	97541	54
7	27 4	32 56	51520	4	48480	53984	5	46016	02464	1	97536	53
8	26 56	33 4	51557	5	48443	54025	5	45975	02468	1	97532	52
9	26 48	33 12	51593	5	48407	54065	6	45935	02472	1	97528	51
10	9 26 40	2 33 20	9.51629	6	10.48371	9.54106	7	10.45894	10.02477	1	9.97523	50
11	26 32	33 28	51666	7	48334	54147	7	45853	02481	1	97519	49
12	26 24	33 36	51702	7	48298	54187	8	45813	02485	1	97515	48
13	26 16	33 44	51738	8	48262	54228	9	45772	02490	1	97510	47
14	26 8	33 52	51774	8	48226	54269	9	45731	02494	1	97506	46
15	9 26 0	2 34 0	9.51811	9	10.48189	9.54309	10	10.45691	10.02499	1	9.97501	45
16	25 52	34 8	51847	10	48153	54350	11	45650	02503	1	97497	44
17	25 44	34 16	51883	10	48117	54390	11	45610	02508	1	97492	43
18	25 36	34 24	51919	11	48081	54431	12	45569	02512	1	97488	42
19	25 28	34 32	51955	11	48045	54471	13	45529	02516	1	97484	41
20	9 25 20	2 34 40	9.51991	12	10.48009	9.54512	13	10.45488	10.02521	1	9.97479	40
21	25 12	34 48	52027	12	47973	54552	14	45448	02525	2	97475	39
22	25 4	34 56	52063	13	47937	54593	15	45407	02530	2	97470	38
23	24 56	35 4	52099	14	47901	54633	15	45367	02534	2	97466	37
24	24 48	35 12	52135	14	47865	54673	16	45327	02539	2	97461	36
25	9 24 40	2 35 20	9.52171	15	10.47829	9.54714	17	10.45286	10.02543	2	9.97457	35
26	24 32	35 28	52207	15	47793	54754	17	45246	02547	2	97453	34
27	24 24	35 36	52242	16	47758	54794	18	45206	02552	2	97448	33
28	24 16	35 44	52278	17	47722	54835	19	45165	02556	2	97444	32
29	24 8	35 52	52314	17	47686	54875	19	45125	02561	2	97439	31
30	9 24 0	2 36 0	9.52350	18	10.47650	9.54915	20	10.45085	10.02565	2	9.97435	30
31	23 52	36 8	52385	18	47615	54955	21	45045	02570	2	97430	29
32	23 44	36 16	52421	19	47579	54995	21	45005	02574	2	97426	28
33	23 36	36 24	52456	20	47544	55035	22	44965	02579	2	97421	27
34	23 28	36 32	52492	20	47508	55075	23	44925	02583	3	97417	26
35	9 23 20	2 36 40	9.52527	21	10.47473	9.55115	23	10.44885	10.02588	3	9.97412	25
36	23 12	36 48	52563	21	47437	55155	24	44845	02592	3	97408	24
37	23 4	36 56	52598	22	47402	55195	25	44805	02597	3	97403	23
38	22 56	37 4	52634	23	47366	55235	25	44765	02601	3	97399	22
39	22 48	37 12	52669	23	47331	55275	26	44725	02606	3	97394	21
40	9 22 40	2 37 20	9.52705	24	10.47295	9.55315	27	10.44685	10.02610	3	9.97390	20
41	22 32	37 28	52740	24	47260	55355	27	44645	02615	3	97385	19
42	22 24	37 36	52775	25	47225	55395	28	44605	02619	3	97381	18
43	22 16	37 44	52811	26	47189	55434	29	44566	02624	3	97376	17
44	22 8	37 52	52846	26	47154	55474	29	44526	02628	3	97372	16
45	9 22 0	2 38 0	9.52881	27	10.47119	9.55514	30	10.44486	10.02633	3	9.97367	15
46	21 52	38 8	52916	27	47084	55554	31	44446	02637	3	97363	14
47	21 44	38 16	52951	28	47049	55593	31	44407	02642	3	97358	13
48	21 36	38 24	52986	29	47014	55633	32	44367	02647	4	97353	12
49	21 28	38 32	53021	29	46979	55673	33	44327	02651	4	97349	11
50	9 21 20	2 38 40	9.53056	30	10.46944	9.55712	33	10.44288	10.02656	4	9.97344	10
51	21 12	38 48	53092	30	46908	55752	34	44248	02660	4	97340	9
52	21 4	38 56	53126	31	46874	55791	35	44209	02665	4	97335	8
53	20 56	39 4	53161	32	46839	55831	35	44169	02669	4	97331	7
54	20 48	39 12	53196	32	46804	55870	36	44130	02674	4	97326	6
55	9 20 40	2 39 20	9.53231	33	10.46769	9.55910	37	10.44090	10.02678	4	9.97322	5
56	20 32	39 28	53266	33	46734	55949	37	44051	02683	4	97317	4
57	20 24	39 36	53301	34	46699	55989	38	44011	02688	4	97312	3
58	20 16	39 44	53336	34	46664	56028	39	43972	02692	4	97308	2
59	20 8	39 52	53370	35	46630	56067	39	43933	02697	4	97303	1
60	20 0	40 0	53405	36	46595	56107	40	43893	02701	4	97299	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
109°			A		A	B		B	C		C	70°

Seconds of time........		1ˢ	2ˢ	3ˢ	4ˢ	5ˢ	6ˢ	7ˢ
Prop. parts of cols.	A	4	9	13	18	22	27	31
	B	5	10	15	20	25	30	35
	C	1	1	2	2	3	3	4

TABLE 44.

Log. Sines, Tangents, and Secants.

20°			A		A	B		B	C		C	159°
M.	**Hour A. M.**	**Hour P. M.**	**Sine.**	**Diff.**	**Cosecant.**	**Tangent.**	**Diff.**	**Cotangent.**	**Secant.**	**Diff.**	**Cosine.**	**M.**
0	9 20 0	2 40 0	9.53405	0	10.46595	9.56107	0	10.43893	10.02701	0	9.97299	60
1	19 52	40 8	53440	1	46560	56146	1	43854	02706	0	97294	59
2	19 44	40 16	53475	1	46525	56185	1	43815	02711	0	97289	58
3	19 36	40 24	53509	2	46491	56224	2	43776	02715	0	97285	57
4	19 28	40 32	53544	2	46456	56264	3	43736	02720	0	97280	56
5	9 19 20	2 40 40	9.53578	3	10.46422	9.56303	3	10.43697	10.02724	0	9.97276	55
6	19 12	40 48	53613	3	46387	56342	4	43658	02729	0	97271	54
7	19 4	40 56	53647	4	46353	56381	4	43619	02734	1	97266	53
8	18 56	41 4	53682	5	46318	56420	5	43580	02738	1	97262	52
9	18 48	41 12	53716	5	46284	56459	6	43541	02743	1	97257	51
10	9 18 40	2 41 20	9.53751	6	10.46249	9.56498	6	10.43502	10.02748	1	9.97252	50
11	18 32	41 28	53785	6	46215	56537	7	43463	02752	1	97248	49
12	18 24	41 36	53819	7	46181	56576	8	43424	02757	1	97243	48
13	18 16	41 44	53854	7	46146	56615	8	43385	02762	1	97238	47
14	18 8	41 52	53888	8	46112	56654	9	43346	02766	1	97234	46
15	9 18 0	2 42 0	9.53922	8	10.46078	9.56693	10	10.43307	10.02771	1	9.97229	45
16	17 52	42 8	53957	9	46043	56732	10	43268	02776	1	97224	44
17	17 44	42 16	53991	10	46009	56771	11	43229	02780	1	97220	43
18	17 36	42 24	54025	10	45975	56810	12	43190	02785	1	97215	42
19	17 28	42 32	54059	11	45941	56849	12	43151	02790	1	97210	41
20	9 17 20	2 42 40	9.54093	11	10.45907	9.56887	13	10.43113	10.02794	2	9.97206	40
21	17 12	42 48	54127	12	45873	56926	13	43074	02799	2	97201	39
22	17 4	42 56	54161	12	45839	56965	14	43035	02804	2	97196	38
23	16 56	43 4	54195	13	45805	57004	15	42996	02808	2	97192	37
24	16 48	43 12	54229	14	45771	57042	15	42958	02813	2	97187	36
25	9 16 40	2 43 20	9.54263	14	10.45737	9.57081	16	10.42919	10.02818	2	9.97182	35
26	16 32	43 28	54297	15	45703	57120	17	42880	02822	2	97178	34
27	16 24	43 36	54331	15	45669	57158	17	42842	02827	2	97173	33
28	16 16	43 44	54365	16	45635	57197	18	42803	02832	2	97168	32
29	16 8	43 52	54399	16	45601	57235	19	42765	02837	2	97163	31
30	9 16 0	2 44 0	9.54433	17	10.45567	9.57274	19	10.42726	10.02841	2	9.97159	30
31	15 52	44 8	54466	17	45534	57312	20	42688	02846	2	97154	29
32	15 44	44 16	54500	18	45500	57351	21	42649	02851	3	97149	28
33	15 36	44 24	54534	19	45466	57389	21	42611	02855	3	97145	27
34	15 28	44 32	54567	19	45433	57428	22	42572	02860	3	97140	26
35	9 15 20	2 44 40	9.54601	20	10.45399	9.57466	22	10.42534	10.02865	3	9.97135	25
36	15 12	44 48	54635	20	45365	57504	23	42496	02870	3	97130	24
37	15 4	44 56	54668	21	45332	57543	24	42457	02874	3	97126	23
38	14 56	45 4	54702	21	45298	57581	24	42419	02879	3	97121	22
39	14 48	45 12	54735	22	45265	57619	25	42381	02884	3	97116	21
40	9 14 40	2 45 20	9.54769	23	10.45231	9.57658	26	10.42342	10.02889	3	9.97111	20
41	14 32	45 28	54802	23	45198	57696	26	42304	02893	3	97107	19
42	14 24	45 36	54836	24	45164	57734	27	42266	02898	3	97102	18
43	14 16	45 44	54869	24	45131	57772	28	42228	02903	3	97097	17
44	14 8	45 52	54903	25	45097	57810	28	42190	02908	3	97092	16
45	9 14 0	2 46 0	9.54936	25	10.45064	9.57849	29	10.42151	10.02913	4	9.97087	15
46	13 52	46 8	54969	26	45031	57887	30	42113	02917	4	97083	14
47	13 44	46 16	55003	26	44997	57925	30	42075	02922	4	97078	13
48	13 36	46 24	55036	27	44964	57963	31	42037	02927	4	97073	12
49	13 28	46 32	55069	28	44931	58001	31	41999	02932	4	97068	11
50	9 13 20	2 46 40	9.55102	28	10.44898	9.58039	32	10.41961	10.02937	4	9.97063	10
51	13 12	46 48	55136	29	44864	58077	33	41923	02941	4	97059	9
52	13 4	46 56	55169	29	44831	58115	33	41885	02946	4	97054	8
53	12 56	47 4	55202	30	44798	58153	34	41847	02951	4	97049	7
54	12 48	47 12	55235	30	44765	58191	35	41809	02956	4	97044	6
55	9 12 40	2 47 20	9.55268	31	10.44732	9.58229	35	10.41771	10.02961	4	9.97039	5
56	12 32	47 28	55301	32	44699	58267	36	41733	02965	4	97035	4
57	12 24	47 36	55334	32	44666	58304	37	41696	02970	4	97030	3
58	12 16	47 44	55367	33	44633	58342	37	41658	02975	5	97025	2
59	12 8	47 52	55400	33	44600	58380	38	41620	02980	5	97020	1
60	12 0	48 0	55433	34	44567	58418	39	41582	02985	5	97015	0
M.	**Hour P. M.**	**Hour A. M.**	**Cosine.**	**Diff.**	**Secant.**	**Cotangent.**	**Diff.**	**Tangent.**	**Cosecant.**	**Diff.**	**Sine.**	**M.**
110°			A		A	B		B	C		C	69°

Seconds of time.......		1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols.	A	4	8	13	17	21	25	30
	B	5	10	14	19	24	29	34
	C	1	1	2	2	3	4	4

TABLE 44.

Log. Sines, Tangents, and Secants.

21°			A		A	B		B	C		C	158°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	9 12 0	2 48 0	9. 55433	0	10. 44567	9. 58418	0	10. 41582	10. 02985	0	9. 97015	60
1	11 52	48 8	55466	1	44534	58455	1	41545	02990	0	97010	59
2	11 44	48 16	55499	1	44501	58493	1	41507	02995	0	97005	58
3	11 36	48 24	55532	2	44468	58531	2	41469	02999	0	97001	57
4	11 28	48 32	55564	2	44436	58569	2	41431	03004	0	96996	56
5	9 11 20	2 48 40	9. 55597	3	10. 44403	9. 58606	3	10. 41394	10. 03009	0	9. 96991	55
6	11 12	48 48	55630	3	44370	58644	4	41356	03014	0	96986	54
7	11 4	48 56	55663	4	44337	58681	4	41319	03019	1	96981	53
8	10 56	49 4	55695	4	44305	58719	5	41281	03024	1	96976	52
9	10 48	49 12	55728	5	44272	58757	6	41243	03029	1	96971	51
10	9 10 40	2 49 20	9. 55761	5	10. 44239	9. 58794	6	10. 41206	10. 03034	1	9. 96966	50
11	10 32	49 28	55793	6	44207	58832	7	41168	03038	1	96962	49
12	10 24	49 36	55826	6	44174	58869	7	41131	03043	1	96957	48
13	10 16	49 44	55858	7	44142	58907	8	41093	03048	1	96952	47
14	10 8	49 52	55891	7	44109	58944	9	41056	03053	1	96947	46
15	9 10 0	2 50 0	9. 55923	8	10. 44077	9. 58981	9	10. 41019	10. 03058	1	9. 96942	45
16	9 52	50 8	55956	9	44044	59019	10	40981	03063	1	96937	44
17	9 44	50 16	55988	9	44012	59056	10	40944	03068	1	96932	43
18	9 36	50 24	56021	10	43979	59094	11	40906	03073	1	96927	42
19	9 28	50 32	56053	10	43947	59131	12	40869	03078	2	96922	41
20	9 9 20	2 50 40	9. 56085	11	10. 43915	9. 59168	12	10. 40832	10. 03083	2	9. 96917	40
21	9 12	50 48	56118	11	43882	59205	13	40795	03088	2	96912	39
22	9 4	50 56	56150	12	43850	59243	14	40757	03093	2	96907	38
23	8 56	51 4	56182	12	43818	59280	14	40720	03097	2	96903	37
24	8 48	51 12	56215	13	43785	59317	15	40683	03102	2	96898	36
25	9 8 40	2 51 20	9. 56247	13	10. 43753	9. 59354	15	10. 40646	10. 03107	2	9. 96893	35
26	8 32	51 28	56279	14	43721	59391	16	40609	03112	2	96888	34
27	8 24	51 36	56311	14	43689	59429	17	40571	03117	2	96883	33
28	8 16	51 44	56343	15	43657	59466	17	40534	03122	2	96878	32
29	8 8	51 52	56375	16	43625	59503	18	40497	03127	2	96873	31
30	9 8 0	2 52 0	9. 56408	16	10. 43592	9. 59540	19	10. 40460	10. 03132	2	9. 96868	30
31	7 52	52 8	56440	17	43560	59577	19	40423	03137	3	96863	29
32	7 44	52 16	56472	17	43528	59614	20	40386	03142	3	96858	28
33	7 36	52 24	56504	18	43496	59651	20	40349	03147	3	96853	27
34	7 28	52 32	56536	18	43464	59688	21	40312	03152	3	96848	26
35	9 7 20	2 52 40	9. 56568	19	10. 43432	9. 59725	22	10. 40275	10. 03157	3	9. 96843	25
36	7 12	52 48	56599	19	43401	59762	22	40238	03162	3	96838	24
37	7 4	52 56	56631	20	43369	59799	23	40201	03167	3	96833	23
38	6 56	53 4	56663	20	43337	59835	23	40165	03172	3	96828	22
39	6 48	53 12	56695	21	43305	59872	24	40128	03177	3	96823	21
40	9 6 40	2 53 20	9. 56727	21	10. 43273	9. 59909	25	10. 40091	10. 03182	3	9. 96818	20
41	6 32	53 28	56759	22	43241	59946	25	40054	03187	3	96813	19
42	6 24	53 36	56790	22	43210	59983	26	40017	03192	3	96808	18
43	6 16	53 44	56822	23	43178	60019	27	39981	03197	4	96803	17
44	6 8	53 52	56854	24	43146	60056	27	39944	03202	4	96798	16
45	9 6 0	2 54 0	9. 56886	24	10. 43114	9. 60093	28	10. 39907	10. 03207	4	9. 96793	15
46	5 52	54 8	56917	25	43083	60130	28	39870	03212	4	96788	14
47	5 44	54 16	56949	25	43051	60166	29	39834	03217	4	96783	13
48	5 36	54 24	56980	26	43020	60203	30	39797	03222	4	96778	12
49	5 28	54 32	57012	26	42988	60240	30	39760	03228	4	96772	11
50	9 5 20	2 54 40	9. 57044	27	10. 42956	9. 60276	31	10. 39724	10. 03233	4	9. 96767	10
51	5 12	54 48	57075	27	42925	60313	31	39687	03238	4	96762	9
52	5 4	54 56	57107	28	42893	60349	32	39651	03243	4	96757	8
53	4 56	55 4	57138	28	42862	60386	33	39614	03248	4	96752	7
54	4 48	55 12	57169	29	42831	60422	33	39578	03253	4	96747	6
55	9 4 40	2 55 20	9. 57201	29	10. 42799	9. 60459	34	10. 39541	10. 03258	5	9. 96742	5
56	4 32	55 28	57232	30	42768	60495	35	39505	03263	5	96737	4
57	4 24	55 36	57264	30	42736	60532	35	39468	03268	5	96732	3
58	4 16	55 44	57295	31	42705	60568	36	39432	03273	5	96727	2
59	4 8	55 52	57326	32	42674	60605	36	39395	03278	5	96722	1
60	4 0	56 0	57358	32	42642	60641	37	39359	03283	5	96717	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
111°			A		A	B		B	C		C	68°

Second of time		1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols.	A	4	8	12	16	20	24	28
	B	5	9	14	19	23	28	32
	C	1	1	2	2	3	4	4

TABLE 44.

Log. Sines, Tangents, and Secants.

22°			A		A	B		B	C		C	157°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	9 4 0	2 56 0	9. 57358	0	10. 42642	9. 60641	0	10. 39359	10. 03283	0	9. 96717	60
1	3 52	56 8	57389	1	42611	60677	1	39323	03289	0	96711	59
2	3 44	56 16	57420	1	42580	60714	1	39286	03294	0	96706	58
3	3 36	56 24	57451	2	42549	60750	2	39250	03299	0	96701	57
4	3 28	56 32	57482	2	42518	60786	2	39214	03304	0	96696	56
5	9 3 20	2 56 40	9. 57514	3	10. 42486	9. 60823	3	10. 39177	10. 03309	0	9. 96691	55
6	3 12	56 48	57545	3	42455	60859	4	39141	03314	1	96686	54
7	3 4	56 56	57576	4	42424	60895	4	39105	03319	1	96681	53
8	2 56	57 4	57607	4	42393	60931	5	39069	03324	1	96676	52
9	2 48	57 12	57638	5	42362	60967	5	39033	03330	1	96670	51
10	9 2 40	2 57 20	9. 57669	5	10. 42331	9. 61004	6	10. 38996	10. 03335	1	9. 96665	50
11	2 32	57 28	57700	6	42300	61040	7	38960	03340	1	96660	49
12	2 24	57 36	57731	6	42269	61076	7	38924	03345	1	96655	48
13	2 16	57 44	57762	7	42238	61112	8	38888	03350	1	96650	47
14	2 8	57 52	57793	7	42207	61148	8	38852	03355	1	96645	46
15	9 2 0	2 58 0	9. 57824	8	10. 42176	9. 61184	9	10. 38816	10. 03360	1	9. 96640	45
16	1 52	58 8	57855	8	42145	61220	10	38780	03366	1	96634	44
17	1 44	58 16	57885	9	42115	61256	10	38744	03371	1	96629	43
18	1 36	58 24	57916	9	42084	61292	11	38708	03376	2	96624	42
19	1 28	58 32	57947	10	42053	61328	11	38672	03381	2	96619	41
20	9 1 20	2 58 40	9. 57978	10	10. 42022	9. 61364	12	10. 38636	10. 03386	2	9. 96614	40
21	1 12	58 48	58008	11	41992	61400	13	38600	03392	2	96608	39
22	1 4	58 56	58039	11	41961	61436	13	38564	03397	2	96603	38
23	0 56	59 4	58070	12	41930	61472	14	38528	03402	2	96598	37
24	0 48	59 12	58101	12	41899	61508	14	38492	03407	2	96593	36
25	9 0 40	2 59 20	9. 58131	13	10. 41869	9. 61544	15	10. 38456	10. 03412	2	9. 96588	35
26	0 32	59 28	58162	13	41838	61579	15	38421	03418	2	96582	34
27	0 24	59 36	58192	14	41808	61615	16	38385	03423	2	96577	33
28	0 16	59 44	58223	14	41777	61651	17	38349	03428	2	96572	32
29	0 8	59 52	58253	15	41747	61687	17	38313	03433	3	96567	31
30	9 0 0	3 0 0	9. 58284	15	10. 41716	9. 61722	18	10. 38278	10. 03438	3	9. 96562	30
31	8 59 52	0 8	58314	16	41686	61758	18	38242	03444	3	96556	29
32	59 44	0 16	58345	16	41655	61794	19	38206	03449	3	96551	28
33	59 36	0 24	58375	17	41625	61830	20	38170	03454	3	96546	27
34	59 28	0 32	58406	17	41594	61865	20	38135	03459	3	96541	26
35	8 59 20	3 0 40	9. 58436	18	10. 41564	9. 61901	21	10. 38099	10. 03465	3	9. 96535	25
36	59 12	0 48	58467	18	41533	61936	21	38064	03470	3	96530	24
37	59 4	0 56	58497	19	41503	61972	22	38028	03475	3	96525	23
38	58 56	1 4	58527	19	41473	62008	23	37992	03480	3	96520	22
39	58 48	1 12	58557	20	41443	62043	23	37957	03486	3	96514	21
40	8 58 40	3 1 20	9. 58588	20	10. 41412	9. 62079	24	10. 37921	10. 03491	3	9. 96509	20
41	58 32	1 28	58618	21	41382	62114	24	37886	03496	4	96504	19
42	58 24	1 36	58648	21	41352	62150	25	37850	03502	4	96498	18
43	58 16	1 44	58678	22	41322	62185	26	37815	03507	4	96493	17
44	58 8	1 52	58709	22	41291	62221	26	37779	03512	4	96488	16
45	8 58 0	3 2 0	9. 58739	23	10. 41261	9. 62256	27	10. 37744	10. 03517	4	9. 96483	15
46	57 52	2 8	58769	23	41231	62292	27	37708	03523	4	96477	14
47	57 44	2 16	58799	24	41201	62327	28	37673	03528	4	96472	13
48	57 36	2 24	58829	24	41171	62362	29	37638	03533	4	96467	12
49	57 28	2 32	58859	25	41141	62398	29	37602	03539	4	96461	11
50	8 57 20	3 2 40	9. 58889	25	10. 41111	9. 62433	30	10. 37567	10. 03544	4	9. 96456	10
51	57 12	2 48	58919	26	41081	62468	30	37532	03549	4	96451	9
52	57 4	2 56	58949	26	41051	62504	31	37496	03555	5	96445	8
53	56 56	3 4	58979	27	41021	62539	32	37461	03560	5	96440	7
54	56 48	3 12	59009	27	40991	62574	32	37426	03565	5	96435	6
55	8 56 40	3 3 20	9. 59039	28	10. 40961	9. 62609	33	10. 37391	10. 03571	5	9. 96429	5
56	56 32	3 28	59069	28	40931	62645	33	37355	03576	5	96424	4
57	56 24	3 36	59098	29	40902	62680	34	37320	03581	5	96419	3
58	56 16	3 44	59128	29	40872	62715	35	37285	03587	5	96413	2
59	56 8	3 52	59158	30	40842	62750	35	37250	03592	5	96408	1
60	56 0	4 0	59188	31	40812	62785	36	37215	03597	5	96403	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
112°			A		A	B		B	C		C	67°

Seconds of time		1ˢ	2ˢ	3ˢ	4ˢ	5ˢ	6ˢ	7ˢ
Prop. parts of cols.	A	4	8	11	15	19	23	27
	B	4	9	13	18	22	27	31
	C	1	1	2	3	3	4	5

TABLE 44.

Log. Sines, Tangents, and Secants.

23°			A		A	B		B	C		C	156°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	8 56 0	3 4 0	9. 59188	0	10. 40812	9. 62785	0	10. 37215	10. 03597	0	9. 96403	60
1	55 52	4 8	59218	0	40782	62820	1	37180	03603	0	96397	59
2	55 44	4 16	59247	1	40753	62855	1	37145	03608	0	96392	58
3	55 36	4 24	59277	1	40723	62890	2	37110	03613	0	96387	57
4	55 28	4 32	59307	2	40693	62926	2	37074	03619	0	96381	56
5	8 55 20	3 4 40	9. 59336	2	10. 40664	9. 62961	3	10. 37039	10. 03624	0	9. 96376	55
6	55 12	4 48	59366	3	40634	62996	3	37004	03630	1	96370	54
7	55 4	4 56	59396	3	40604	63031	4	36969	03635	1	96365	53
8	54 56	5 4	59425	4	40575	63066	5	36934	03640	1	96360	52
9	54 48	5 12	59455	4	40545	63101	5	36899	03646	1	96354	51
10	8 54 40	3 5 20	9. 59484	5	10. 40516	9. 63135	6	10. 36865	10. 03651	1	9. 96349	50
11	54 32	5 28	59514	5	40486	63170	6	36830	03657	1	96343	49
12	54 24	5 36	59543	6	40457	63205	7	36795	03662	1	96338	48
13	54 16	5 44	59573	6	40427	63240	7	36760	03667	1	96333	47
14	54 8	5 52	59602	7	40398	63275	8	36725	03673	1	96327	46
15	8 54 0	3 6 0	9. 59632	7	10. 40368	9. 63310	9	10. 36690	10. 03678	1	9. 96322	45
16	53 52	6 8	59661	8	40339	63345	9	36655	03684	1	96316	44
17	53 44	6 16	59690	8	40310	63379	10	36621	03689	2	96311	43
18	53 36	6 24	59720	9	40280	63414	10	36586	03695	2	96305	42
19	53 28	6 32	59749	9	40251	63449	11	36551	03700	2	96300	41
20	8 53 20	3 6 40	9. 59778	10	10. 40222	9. 63484	12	10. 36516	10. 03706	2	9. 96294	40
21	53 12	6 48	59808	10	40192	63519	12	36481	03711	2	96289	39
22	53 4	6 56	59837	11	40163	63553	13	36447	03716	2	96284	38
23	52 56	7 4	59866	11	40134	63588	13	36412	03722	2	96278	37
24	52 48	7 12	59895	12	40105	63623	14	36377	03727	2	96273	36
25	8 52 40	3 7 20	9. 59924	12	10. 40076	9. 63657	14	10. 36343	10. 03733	2	9. 96267	35
26	52 32	7 28	59954	13	40046	63692	15	36308	03738	2	96262	34
27	52 24	7 36	59983	13	40017	63726	16	36274	03744	2	96256	33
28	52 16	7 44	60012	14	39988	63761	16	36239	03749	3	96251	32
29	52 8	7 52	60041	14	39959	63796	17	36204	03755	3	96245	31
30	8 52 0	3 8 0	9. 60070	15	10. 39930	9. 63830	17	10. 36170	10. 03760	3	9. 96240	30
31	51 52	8 8	60099	15	39901	63865	18	36135	03766	3	96234	29
32	51 44	8 16	60128	15	39872	63899	18	36101	03771	3	96229	28
33	51 36	8 24	60157	16	39843	63934	19	36066	03777	3	96223	27
34	51 28	8 32	60186	16	39814	63968	20	36032	03782	3	96218	26
35	8 51 20	3 8 40	9. 60215	17	10. 39785	9. 64003	20	10. 35997	10. 03788	3	9. 96212	25
36	51 12	8 48	60244	17	39756	64037	21	35963	03793	3	96207	24
37	51 4	8 56	60273	18	39727	64072	21	35928	03799	3	96201	23
38	50 56	9 4	60302	18	39698	64106	22	35894	03804	3	96196	22
39	50 48	9 12	60331	19	39669	64140	22	35860	03810	4	96190	21
40	8 50 40	3 9 20	9. 60359	19	10. 39641	9. 64175	23	10. 35825	10. 03815	4	9. 96185	20
41	50 32	9 28	60388	20	39612	64209	24	35791	03821	4	96179	19
42	50 24	9 36	60417	20	39583	64243	24	35757	03826	4	96174	18
43	50 16	9 44	60446	21	39554	64278	25	35722	03832	4	96168	17
44	50 8	9 52	60474	21	39526	64312	25	35688	03838	4	96162	16
45	8 50 0	3 10 0	9. 60503	22	10. 39497	9. 64346	26	10. 35654	10. 03843	4	9. 96157	15
46	49 52	10 8	60532	22	39468	64381	26	35619	03849	4	96151	14
47	49 44	10 16	60561	23	39439	64415	27	35585	03854	4	96146	13
48	49 36	10 24	60589	23	39411	64449	28	35551	03860	4	96140	12
49	49 28	10 32	60618	24	39382	64483	28	35517	03865	4	96135	11
50	8 49 20	3 10 40	9. 60646	24	10. 39354	9. 64517	29	10. 35483	10. 03871	5	9. 96129	10
51	49 12	10 48	60675	25	39325	64552	29	35448	03877	5	96123	9
52	49 4	10 56	60704	25	39296	64586	30	35414	03882	5	96118	8
53	48 56	11 4	60732	26	39268	64620	31	35380	03888	5	96112	7
54	48 48	11 12	60761	26	39239	64654	31	35346	03893	5	96107	6
55	8 48 40	3 11 20	9. 60789	27	10. 39211	9. 64688	32	10. 35312	10. 03899	5	9. 96101	5
56	48 32	11 28	60818	27	39182	64722	32	35278	03905	5	96095	4
57	48 24	11 36	60846	28	39154	64756	33	35244	03910	5	96090	3
58	48 16	11 44	60875	28	39125	64790	33	35210	03916	5	96084	2
59	48 8	11 52	60903	29	39097	64824	34	35176	03921	5	96079	1
60	48 0	12 0	60931	29	39069	64858	35	35142	03927	6	96073	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
113°			A		A	B		B	C		C	66°

Seconds of time	1^s	2^s	3^s	4^s	5^s	6^s	7^s
Prop. parts of cols. A	4	7	11	15	18	22	25
Prop. parts of cols. B	4	9	13	17	22	26	31
Prop. parts of cols. C	1	1	2	3	3	4	5

TABLE 44.

Log. Sines, Tangents, and Secants.

24°			A		A	B		B	C		C	155°
M.	**Hour A. M.**	**Hour P. M.**	**Sine.**	**Diff.**	**Cosecant.**	**Tangent.**	**Diff.**	**Cotangent.**	**Secant.**	**Diff.**	**Cosine.**	**M.**
0	8 48 0	3 12 0	9.60931	0	10.39069	9.64858	0	10.35142	10.03927	0	9.96073	60
1	47 52	12 8	60960	0	39040	64892	1	35108	03933	0	96067	59
2	47 44	12 16	60988	1	39012	64926	1	35074	03938	0	96062	58
3	47 36	12 24	61016	1	38984	64960	2	35040	03944	0	96056	57
4	47 28	12 32	61045	2	38955	64994	2	35006	03950	0	96050	56
5	8 47 20	3 12 40	9.61073	2	10.38927	9.65028	3	10.34972	10.03955	0	9.96045	55
6	47 12	12 48	61101	3	38899	65062	3	34938	03961	1	96039	54
7	47 4	12 56	61129	3	38871	65096	4	34904	03966	1	96034	53
8	46 56	13 4	61158	4	38842	65130	4	34870	03972	1	96028	52
9	46 48	13 12	61186	4	38814	65164	5	34836	03978	1	96022	51
10	8 46 40	3 13 20	9.61214	5	10.38786	9.65197	6	10.34803	10.03983	1	9.96017	50
11	46 32	13 28	61242	5	38758	65231	6	34769	03989	1	96011	49
12	46 24	13 36	61270	6	38730	65265	7	34735	03995	1	96005	48
13	46 16	13 44	61298	6	38702	65299	7	34701	04000	1	96000	47
14	46 8	13 52	61326	6	38674	65333	8	34667	04006	1	95994	46
15	8 46 0	3 14 0	9.61354	7	10.38646	9.65366	8	10.34634	10.04012	1	9.95988	45
16	45 52	14 8	61382	7	38618	65400	9	34600	04018	2	95982	44
17	45 44	14 16	61411	8	38589	65434	9	34566	04023	2	95977	43
18	45 36	14 24	61438	8	38562	65467	10	34533	04029	2	95971	42
19	45 28	14 32	61466	9	38534	65501	11	34499	04035	2	95965	41
20	8 45 20	3 14 40	9.61494	9	10.38506	9.65535	11	10.34465	10.04040	2	9.95960	40
21	45 12	14 48	61522	10	38478	65568	12	34432	04046	2	95954	39
22	45 4	14 56	61550	10	38450	65602	12	34398	04052	2	95948	38
23	44 56	15 4	61578	11	38422	65636	13	34364	04058	2	95942	37
24	44 48	15 12	61606	11	38394	65669	13	34331	04063	2	95937	36
25	8 44 40	3 15 20	9.61634	12	10.38366	9.65703	14	10.34297	10.04069	2	9.95931	35
26	44 32	15 28	61662	12	38338	65736	15	34264	04075	2	95925	34
27	44 24	15 36	61689	12	38311	65770	15	34230	04080	3	95920	33
28	44 16	15 44	61717	13	38283	65803	16	34197	04086	3	95914	32
29	44 8	15 52	61745	13	38255	65837	16	34163	04092	3	95908	31
30	8 44 0	3 16 0	9.61773	14	10.38227	9.65870	17	10.34130	10.04098	3	9.95902	30
31	43 52	16 8	61800	14	38200	65904	17	34096	04103	3	95897	29
32	43 44	16 16	61828	15	38172	65937	18	34063	04109	3	95891	28
33	43 36	16 24	61856	15	38144	65971	18	34029	04115	3	95885	27
34	43 28	16 32	61883	16	38117	66004	19	33996	04121	3	95879	26
35	8 43 20	3 16 40	9.61911	16	10.38089	9.66038	20	10.33962	10.04127	3	9.95873	25
36	43 12	16 48	61939	17	38061	66071	20	33929	04132	3	95868	24
37	43 4	16 56	61966	17	38034	66104	21	33896	04138	4	95862	23
38	42 56	17 4	61994	18	38006	66138	21	33862	04144	4	95856	22
39	42 48	17 12	62021	18	37979	66171	22	33829	04150	4	95850	21
40	8 42 40	3 17 20	9.62049	18	10.37951	9.66204	22	10.33796	10.04156	4	9.95844	20
41	42 32	17 28	62076	19	37924	66238	23	33762	04161	4	95839	19
42	42 24	17 36	62104	19	37896	66271	23	33729	04167	4	95833	18
43	42 16	17 44	62131	20	37869	66304	24	33696	04173	4	95827	17
44	42 8	17 52	62159	20	37841	66337	25	33663	04179	4	95821	16
45	8 42 0	3 18 0	9.62186	21	10.37814	9.66371	25	10.33629	10.04185	4	9.95815	15
46	41 52	18 8	62214	21	37786	66404	26	33596	04190	4	95810	14
47	41 44	18 16	62241	22	37759	66437	26	33563	04196	5	95804	13
48	41 36	18 24	62268	22	37732	66470	27	33530	04202	5	95798	12
49	41 28	18 32	62296	23	37704	66503	27	33497	04208	5	95792	11
50	8 41 20	3 18 40	9.62323	23	10.37677	9.66537	28	10.33463	10.04214	5	9.95786	10
51	41 12	18 48	62350	24	37650	66570	28	33430	04220	5	95780	9
52	41 4	18 56	62377	24	37623	66603	29	33397	04225	5	95775	8
53	40 56	19 4	62405	24	37595	66636	30	33364	04231	5	95769	7
54	40 48	19 12	62432	25	37568	66669	30	33331	04237	5	95763	6
55	8 40 40	3 19 20	9.62459	25	10.37541	9.66702	31	10.33298	10.04243	5	9.95757	5
56	40 32	19 28	62486	26	37514	66735	31	33265	04249	5	95751	4
57	40 24	19 36	62513	26	37487	66768	32	33232	04255	5	95745	3
58	40 16	19 44	62541	27	37459	66801	32	33199	04261	6	95739	2
59	40 8	19 52	62568	27	37432	66834	33	33166	04267	6	95733	1
60	40 0	20 0	62595	28	37405	66867	33	33133	04272	6	95728	0
M.	**Hour P. M.**	**Hour A. M**	**Cosine.**	**Diff.**	**Secant.**	**Cotangent.**	**Diff.**	**Tangent.**	**Cosecant.**	**Diff.**	**Sine.**	**M.**
114°			A		A	B		B	C		C	65°

Seconds of time........		1^{s}	2^{s}	3^{s}	4^{s}	5^{s}	6^{s}	7^{s}
Prop. parts of cols.	A	3	7	10	14	17	21	24
	B	4	8	13	17	21	25	29
	C	1	1	2	3	4	4	5

TABLE 44.

Log. Sines, Tangents, and Secants.

25°			A		A	B		B	C		C	154°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	8 40 0	3 20 0	9.62595	0	10.37405	9.66867	0	10.33133	10.04272	0	9.95728	60
1	39 52	20 8	62622	0	37378	66900	1	33100	04278	0	95722	59
2	39 44	20 16	62649	1	37351	66933	1	33067	04284	0	95716	58
3	39 36	20 24	62676	1	37324	66966	2	33034	04290	0	95710	57
4	39 28	20 32	62703	2	37297	66999	2	33001	04296	0	95704	56
5	8 39 20	3 20 40	9.62730	2	10.37270	9.67032	3	10.32968	10.04302	1	9.95698	55
6	39 12	20 48	62757	3	37243	67065	3	32935	04308	1	95692	54
7	39 4	20 56	62784	3	37216	67098	4	32902	04314	1	95686	53
8	38 56	21 4	62811	4	37189	67131	4	32869	04320	1	95680	52
9	38 48	21 12	62838	4	37162	67163	5	32837	04326	1	95674	51
10	8 38 40	3 21 20	9.62865	4	10.37135	9.67196	5	10.32804	10.04332	1	9.95668	50
11	38 32	21 28	62892	5	37108	67229	6	32771	04337	1	95663	49
12	38 24	21 36	62918	5	37082	67262	7	32738	04343	1	95657	48
13	38 16	21 44	62945	6	37055	67295	7	32705	04349	1	95651	47
14	38 8	21 52	62972	6	37028	67327	8	32673	04355	1	95645	46
15	8 38 0	3 22 0	9.62999	7	10.37001	9.67360	8	10.32640	10.04361	2	9.95639	45
16	37 52	22 8	63026	7	36974	67393	9	32607	04367	2	95633	44
17	37 44	22 16	63052	8	36948	67426	9	32574	04373	2	95627	43
18	37 36	22 24	63079	8	36921	67458	10	32542	04379	2	95621	42
19	37 28	22 32	63106	8	36894	67491	10	32509	04385	2	95615	41
20	8 37 20	3 22 40	9.63133	9	10.36867	9.67524	11	10.32476	10.04391	2	9.95609	40
21	37 12	22 48	63159	9	36841	67556	11	32444	04397	2	95603	39
22	37 4	22 56	63186	10	36814	67589	12	32411	04403	2	95597	38
23	36 56	23 4	63213	10	36787	67622	12	32378	04409	2	95591	37
24	36 48	23 12	63239	11	36761	67654	13	32346	04415	2	95585	36
25	8 36 40	3 23 20	9.63266	11	10.36734	9.67687	14	10.32313	10.04421	3	9.95579	35
26	36 32	23 28	63292	11	36708	67719	14	32281	04427	3	95573	34
27	36 24	23 36	63319	12	36681	67752	15	32248	04433	3	95567	33
28	36 16	23 44	63345	12	36655	67785	15	32215	04439	3	95561	32
29	36 8	23 52	63372	13	36628	67817	16	32183	04445	3	95555	31
30	8 36 0	3 24 0	9.63398	13	10.36602	9.67850	16	10.32150	10.04451	3	9.95549	30
31	35 52	24 8	63425	14	36575	67882	17	32118	04457	3	95543	29
32	35 44	24 16	63451	14	36549	67915	17	32085	04463	3	95537	28
33	35 36	24 24	63478	15	36522	67947	18	32053	04469	3	95531	27
34	35 28	24 32	63504	15	36496	67980	18	32020	04475	3	95525	26
35	8 35 20	3 24 40	9.63531	15	10.36469	9.68012	19	10.31988	10.04481	4	9.95519	25
36	35 12	24 48	63557	16	36443	68044	20	31956	04487	4	95513	24
37	35 4	24 56	63583	16	36417	68077	20	31923	04493	4	95507	23
38	34 56	25 4	63610	17	36390	68109	21	31891	04500	4	95500	22
39	34 48	25 12	63636	17	36364	68142	21	31858	04506	4	95494	21
40	8 34 40	3 25 20	9.63662	18	10.36338	9.68174	22	10.31826	10.04512	4	9.95488	20
41	34 32	25 28	63689	18	36311	68206	22	31794	04518	4	95482	19
42	34 24	25 36	63715	19	36285	68239	23	31761	04524	4	95476	18
43	34 16	25 44	63741	19	36259	68271	23	31729	04530	4	95470	17
44	34 8	25 52	63767	19	36233	68303	24	31697	04536	4	95464	16
45	8 34 0	3 26 0	9.63794	20	10.36206	9.68336	24	10.31664	10.04542	5	9.95458	15
46	33 52	26 8	63820	20	36180	68368	25	31632	04548	5	95452	14
47	33 44	26 16	63846	21	36154	68400	25	31600	04554	5	95446	13
48	33 36	26 24	63872	21	36128	68432	26	31568	04560	5	95440	12
49	33 28	26 32	63898	22	36102	68465	27	31535	04566	5	95434	11
50	8 33 20	3 26 40	9.63924	22	10.36076	9.68497	27	10.31503	10.04573	5	9.95427	10
51	33 12	26 48	63950	23	36050	68529	28	31471	04579	5	95421	9
52	33 4	26 56	63976	23	36024	68561	28	31439	04585	5	95415	8
53	32 56	27 4	64002	23	35998	68593	29	31407	04591	5	95409	7
54	32 48	27 12	64028	24	35972	68626	29	31374	04597	5	95403	6
55	8 32 40	3 27 20	9.64054	24	10 35946	9.68658	30	10.31342	10.04603	6	9.95397	5
56	32 32	27 28	64080	25	35920	68690	30	31310	04609	6	95391	4
57	32 24	27 36	64106	25	35894	68722	31	31278	04616	6	95384	3
58	32 16	27 44	64132	26	35868	68754	31	31246	04622	6	95378	2
59	32 8	27 52	64158	26	35842	68786	32	31214	04628	6	95372	1
60	32 0	28 0	64184	26	35816	68818	33	31182	04634	6	95366	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M
115°			A		A	B		B	C		C	64°

Seconds of time.......		1ˢ	2ˢ	3ˢ	4ˢ	5ˢ	6ˢ	7ˢ
Prop. parts of cols.	A	3	7	10	13	17	20	23
	B	4	8	12	16	20	24	28
	C	1	2	2	3	4	5	5

TABLE 44.

Log. Sines, Tangents, and Secants.

26°			A		A	B		B	C		C	153°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	8 32 0	3 28 0	9. 64184	0	10. 35816	9. 68818	0	10. 31182	10. 04634	0	9. 95366	60
1	31 52	28 8	64210	0	35790	68850	1	31150	04640	0	95360	59
2	31 44	28 16	64236	1	35764	68882	1	31118	04646	0	95354	58
3	31 36	28 24	64262	1	35738	68914	2	31086	04652	0	95348	57
4	31 28	28 32	64288	2	35712	68946	2	31054	04659	0	95341	56
5	8 31 20	3 28 40	9. 64313	2	10. 35687	9. 68978	3	10. 31022	10. 04665	1	9. 95335	55
6	31 12	28 48	64339	3	35661	69010	3	30990	04671	1	95329	54
7	31 4	28 56	64365	3	35635	69042	4	30958	04677	1	95323	53
8	30 56	29 4	64391	3	35609	69074	4	30926	04683	1	95317	52
9	30 48	29 12	64417	4	35583	69106	5	30894	04690	1	95310	51
10	8 30 40	3 29 20	9. 64442	4	10. 35558	9. 69138	5	10. 30862	10. 04696	1	9. 95304	50
11	30 32	29 28	64468	5	35532	69170	6	30830	04702	1	95298	49
12	30 24	29 36	64494	5	35506	69202	6	30798	04708	1	95292	48
13	30 16	29 44	64519	5	35481	69234	7	30766	04714	1	95286	47
14	30 8	29 52	64545	6	35455	69266	7	30734	04721	1	95279	46
15	8 30 0	3 30 0	9. 64571	6	10. 35429	9. 69298	8	10. 30702	10. 04727	2	9. 95273	45
16	29 52	30 8	64596	7	35404	69329	8	30671	04733	2	95267	44
17	29 44	30 16	64622	7	35378	69361	9	30639	04739	2	95261	43
18	29 36	30 24	64647	8	35353	69393	9	30607	04746	2	95254	42
19	29 28	30 32	64673	8	35327	69425	10	30575	04752	2	95248	41
20	8 29 20	3 30 40	9. 64698	8	10. 35302	9. 69457	11	10. 30543	10. 04758	2	9. 95242	40
21	29 12	30 48	64724	9	35276	69488	11	30512	04764	2	95236	39
22	29 4	30 56	64749	9	35251	69520	12	30480	04771	2	95229	38
23	28 56	31 4	64775	10	35225	69552	12	30448	04777	2	95223	37
24	28 48	31 12	64800	10	35200	69584	13	30416	04783	3	95217	36
25	8 28 40	3 31 20	9. 64826	11	10. 35174	9. 69615	13	10. 30385	10. 04789	3	9. 95211	35
26	28 32	31 28	64851	11	35149	69647	14	30353	04796	3	95204	34
27	28 24	31 36	64877	11	35123	69679	14	30321	04802	3	95198	33
28	28 16	31 44	64902	12	35098	69710	15	30290	04808	3	95192	32
29	28 8	31 52	64927	12	35073	69742	15	30258	04815	3	95185	31
30	8 28 0	3 32 0	9. 64953	13	10. 35047	9. 69774	16	10. 30226	10. 04821	3	9. 95179	30
31	27 52	32 8	64978	13	35022	69805	16	30195	04827	3	95173	29
32	27 44	32 16	65003	14	34997	69837	17	30163	04833	3	95167	28
33	27 36	32 24	65029	14	34971	69868	17	30132	04840	3	95160	27
34	27 28	32 32	65054	14	34946	69900	18	30100	04846	4	95154	26
35	8 27 20	3 32 40	9. 65079	15	10. 34921	9. 69932	18	10. 30068	10. 04852	4	9. 95148	25
36	27 12	32 48	65104	15	34896	69963	19	30037	04859	4	95141	24
37	27 4	32 56	65130	16	34870	69995	20	30005	04865	4	95135	23
38	26 56	33 4	65155	16	34845	70026	20	29974	04871	4	95129	22
39	26 48	33 12	65180	16	34820	70058	21	29942	04878	4	95122	21
40	8 26 40	3 33 20	9. 65205	17	10. 34795	9. 70089	21	10. 29911	10. 04884	4	9. 95116	20
41	26 32	33 28	65230	17	34770	70121	22	29879	04890	4	95110	19
42	26 24	33 36	65255	18	34745	70152	22	29848	04897	4	95103	18
43	26 16	33 44	65281	18	34719	70184	23	29816	04903	5	95097	17
44	26 8	33 52	65306	19	34694	70215	23	29785	04910	5	95090	16
45	8 26 0	3 34 0	9. 65331	19	10. 34669	9. 70247	24	10. 29753	10. 04916	5	9. 95084	15
46	25 52	34 8	65356	19	34644	70278	24	29722	04922	5	95078	14
47	25 44	34 16	65381	20	34619	70309	25	29691	04929	5	95071	13
48	25 36	34 24	65406	20	34594	70341	25	29659	04935	5	95065	12
49	25 28	34 32	65431	21	34569	70372	26	29628	04941	5	95059	11
50	8 25 20	3 34 40	9. 65456	21	10. 34544	9. 70404	26	10. 29596	10. 04948	5	9. 95052	10
51	25 12	34 48	65481	22	34519	70435	27	29565	04954	5	95046	9
52	25 4	34 56	65506	22	34494	70466	27	29534	04961	5	95039	8
53	24 56	35 4	65531	22	34469	70498	28	29502	04967	6	95033	7
54	24 48	35 12	65556	23	34444	70529	28	29471	04973	6	95027	6
55	8 24 40	3 35 20	9. 65580	23	10. 34420	9. 70560	29	10. 29440	10. 04980	6	9. 95020	5
56	24 32	35 28	65605	24	34395	70592	30	29408	04986	6	95014	4
57	24 24	35 36	65630	24	34370	70623	30	29377	04993	6	95007	3
58	24 16	35 44	65655	25	34345	70654	31	29346	04999	6	95001	2
59	24 8	35 52	65680	25	34320	70685	31	29315	05005	6	94995	1
60	24 0	36 0	65705	25	34295	70717	32	29283	05012	6	94988	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
116°			A		A	B		B	C		C	63°

Seconds of time		1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols.	A	3	6	10	13	16	19	22
	B	4	8	12	16	20	24	28
	C	1	2	2	3	4	5	6

TABLE 44.

Log. Sines, Tangents, and Secants.

27°			A		A	B		B	C		C	152°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	8 24 0	3 36 0	9. 65705	0	10. 34295	9. 70717	0	10. 29283	10. 05012	0	9. 94988	60
1	23 52	36 8	65729	0	34271	70748	1	29252	05018	0	94982	59
2	23 44	36 16	65754	1	34246	70779	1	29221	05025	0	94975	58
3	23 36	36 24	65779	1	34221	70810	2	29190	05031	0	94969	57
4	23 28	36 32	65804	2	34196	70841	2	29159	05038	0	94962	56
5	8 23 20	3 36 40	9. 65828	2	10. 34172	9. 70873	3	10. 29127	10. 05044	1	9. 94956	55
6	23 12	36 48	65853	2	34147	70904	3	29096	05051	1	94949	54
7	23 4	36 56	65878	3	34122	70935	4	29065	05057	1	94943	53
8	22 56	37 4	65902	3	34098	70966	4	29034	05064	1	94936	52
9	22 48	37 12	65927	4	34073	70997	5	29003	05070	1	94930	51
10	8 22 40	3 37 20	9. 65952	4	10. 34048	9. 71028	5	10. 28972	10. 05077	1	9. 94923	50
11	22 32	37 28	65976	4	34024	71059	6	28941	05083	1	94917	49
12	22 24	37 36	66001	5	33999	71090	6	28910	05089	1	94911	48
13	22 16	37 44	66025	5	33975	71121	7	28879	05096	1	94904	47
14	22 8	37 52	66050	6	33950	71153	7	28847	05102	2	94898	46
15	8 22 0	3 38 0	9. 66075	6	10. 33925	9. 71184	8	10. 28816	10. 05109	2	9. 94891	45
16	21 52	38 8	66099	6	33901	71215	8	28785	05115	2	94885	44
17	21 44	38 16	66124	7	33876	71246	9	28754	05122	2	94878	43
18	21 36	38 24	66148	7	33852	71277	9	28723	05129	2	94871	42
19	21 28	38 32	66173	8	33827	71308	10	28692	05135	2	94865	41
20	8 21 20	3 38 40	9. 66197	8	10. 33803	9. 71339	10	10. 28661	10. 05142	2	9. 94858	40
21	21 12	38 48	66221	8	33779	71370	11	28630	05148	2	94852	39
22	21 4	38 56	66246	9	33754	71401	11	28599	05155	2	94845	38
23	20 56	39 4	66270	9	33730	71431	12	28569	05161	3	94839	37
24	20 48	39 12	66295	10	33705	71462	12	28538	05168	3	94832	36
25	8 20 40	3 39 20	9. 66319	10	10. 33681	9. 71493	13	10. 28507	10. 05174	3	9. 94826	35
26	20 32	39 28	66343	11	33657	71524	13	28476	05181	3	94819	34
27	20 24	39 36	66368	11	33632	71555	14	28445	05187	3	94813	33
28	20 16	39 44	66392	11	33608	71586	14	28414	05194	3	94806	32
29	20 8	39 52	66416	12	33584	71617	15	28383	05201	3	94799	31
30	8 20 0	3 40 0	9. 66441	12	10. 33559	9. 71648	15	10. 28352	10. 05207	3	9. 94793	30
31	19 52	40 8	66465	13	33535	71679	16	28321	05214	3	94786	29
32	19 44	40 16	66489	13	33511	71709	16	28291	05220	4	94780	28
33	19 36	40 24	66513	13	33487	71740	17	28260	05227	4	94773	27
34	19 28	40 32	66537	14	33463	71771	17	28229	05233	4	94767	26
35	8 19 20	3 40 40	9. 66562	14	10. 33438	9. 71802	18	10. 28198	10. 05240	4	9. 94760	25
36	19 12	40 48	66586	15	33414	71833	19	28167	05247	4	94753	24
37	19 4	40 56	66610	15	33390	71863	19	28137	05253	4	94747	23
38	18 56	41 4	66634	15	33366	71894	20	28106	05260	4	94740	22
39	18 48	41 12	66658	16	33342	71925	20	28075	05266	4	94734	21
40	8 18 40	3 41 20	9. 66682	16	10. 33318	9. 71955	21	10. 28045	10. 05273	4	9. 94727	20
41	18 32	41 28	66706	17	33294	71986	21	28014	05280	4	94720	19
42	18 24	41 36	66731	17	33269	72017	22	27983	05286	5	94714	18
43	18 16	41 44	66755	17	33245	72048	22	27952	05293	5	94707	17
44	18 8	41 52	66779	18	33221	72078	23	27922	05300	5	94700	16
45	8 18 0	3 42 0	9. 66803	18	10. 33197	9. 72109	23	10. 27891	10. 05306	5	9. 94694	15
46	17 52	42 8	66827	19	33173	72140	24	27860	05313	5	94687	14
47	17 44	42 16	66851	19	33149	72170	24	27830	05320	5	94680	13
48	17 36	42 24	66875	19	33125	72201	25	27799	05326	5	94674	12
49	17 28	42 32	66899	20	33101	72231	25	27769	05333	5	94667	11
50	8 17 20	3 42 40	9. 66922	20	10. 33078	9. 72262	26	10. 27738	10. 05340	5	9. 94660	10
51	17 12	42 48	66946	21	33054	72293	26	27707	05346	6	94654	9
52	17 4	42 56	66970	21	33030	72323	27	27677	05353	6	94647	8
53	16 56	43 4	66994	21	33006	72354	27	27646	05360	6	94640	7
54	16 48	43 12	67018	22	32982	72384	28	27616	05366	6	94634	6
55	8 16 40	3 43 20	9. 67042	22	10. 32958	9. 72415	28	10. 27585	10. 05373	6	9. 94627	5
56	16 32	43 28	67066	23	32934	72445	29	27555	05380	6	94620	4
57	16 24	43 36	67090	23	32910	72476	29	27524	05386	6	94614	3
58	16 16	43 44	67113	23	32887	72506	30	27494	05393	6	94607	2
59	16 8	43 52	67137	24	32863	72537	30	27463	05400	6	94600	1
60	16 0	44 0	67161	24	32839	72567	31	27433	05407	7	94593	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
117°			A		A	B		B	C		C	62°

Seconds of time		1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols.	A	3	6	9	12	15	18	21
	B	4	8	12	15	19	23	27
	C	1	2	2	3	4	5	6

TABLE 44.

Log. Sines, Tangents, and Secants.

28°			A		A	B		B	C		C	151°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	8 16 0	3 44 0	9. 67161	0	10. 32839	9. 72567	0	10. 27433	10. 05407	0	9. 94593	60
1	15 52	44 8	67185	0	32815	72598	1	27402	05413	0	94587	59
2	15 44	44 16	67208	1	32792	72628	1	27372	05420	0	94580	58
3	15 36	44 24	67232	1	32768	72659	2	27341	05427	0	94573	57
4	15 28	44 32	67256	2	32744	72689	2	27311	05433	0	94567	56
5	8 15 20	3 44 40	9. 67280	2	10. 32720	9. 72720	3	10. 27280	10. 05440	1	9. 94560	55
6	15 12	44 48	67303	2	32697	72750	3	27250	05447	1	94553	54
7	15 4	44 56	67327	3	32673	72780	4	27220	05454	1	94546	53
8	14 56	45 4	67350	3	32650	72811	4	27189	05460	1	94540	52
9	14 48	45 12	67374	3	32626	72841	5	27159	05467	1	94533	51
10	8 14 40	3 45 20	9. 67398	4	10. 32602	9. 72872	5	10. 27128	10. 05474	1	9. 94526	50
11	14 32	45 28	67421	4	32579	72902	6	27098	05481	1	94519	49
12	14 24	45 36	67445	5	32555	72932	6	27068	05487	1	94513	48
13	14 16	45 44	67468	5	32532	72963	7	27037	05494	1	94506	47
14	14 8	45 52	67492	5	32508	72993	7	27007	05501	2	94499	46
15	8 14 0	3 46 0	9. 67515	6	10. 32485	9. 73023	8	10. 26977	10. 05508	2	9. 94492	45
16	13 52	46 8	67539	6	32461	73054	8	26946	05515	2	94485	44
17	13 44	46 16	67562	7	32438	73084	9	26916	05521	2	94479	43
18	13 36	46 24	67586	7	32414	73114	9	26886	05528	2	94472	42
19	13 28	46 32	67609	7	32391	73144	10	26856	05535	2	94465	41
20	8 13 20	3 46 40	9. 67633	8	10. 32367	9. 73175	10	10. 26825	10. 05542	2	9. 94458	40
21	13 12	46 48	67656	8	32344	73205	11	26795	05549	2	94451	39
22	13 4	46 56	67680	9	32320	73235	11	26765	05555	3	94445	38
23	12 56	47 4	67703	9	32297	73265	12	26735	05562	3	94438	37
24	12 48	47 12	67726	9	32274	73295	12	26705	05569	3	94431	36
25	8 12 40	3 47 20	9. 67750	10	10. 32250	9. 73326	13	10. 26674	10. 05576	3	9. 94424	35
26	12 32	47 28	67773	10	32227	73356	13	26644	05583	3	94417	34
27	12 24	47 36	67796	10	32204	73386	14	26614	05590	3	94410	33
28	12 16	47 44	67820	11	32180	73416	14	26584	05596	3	94404	32
29	12 8	47 52	67843	11	32157	73446	15	26554	05603	3	94397	31
30	8 12 0	3 48 0	9. 67866	12	10. 32134	9. 73476	15	10. 26524	10. 05610	3	9. 94390	30
31	11 52	48 8	67890	12	32110	73507	16	26493	05617	4	94383	29
32	11 44	48 16	67913	12	32087	73537	16	26463	05624	4	94376	28
33	11 36	48 24	67936	13	32064	73567	17	26433	05631	4	94369	27
34	11 28	48 32	67959	13	32041	73597	17	26403	05638	4	94362	26
35	8 11 20	3 48 40	9. 67982	14	10. 32018	9. 73627	18	10. 26373	10. 05645	4	9. 94355	25
36	11 12	48 48	68006	14	31994	73657	18	26343	05651	4	94349	24
37	11 4	48 56	68029	14	31971	73687	19	26313	05658	4	94342	23
38	10 56	49 4	68052	15	31948	73717	19	26283	05665	4	94335	22
39	10 48	49 12	68075	15	31925	73747	20	26253	05672	4	94328	21
40	8 10 40	3 49 20	9. 68098	16	10. 31902	9. 73777	20	10. 26223	10. 05679	5	9. 94321	20
41	10 32	49 28	68121	16	31879	73807	21	26193	05686	5	94314	19
42	10 24	49 36	68144	16	31856	73837	21	26163	05693	5	94307	18
43	10 16	49 44	68167	17	31833	73867	22	26133	05700	5	94300	17
44	10 8	49 52	68190	17	31810	73897	22	26103	05707	5	94293	16
45	8 10 0	3 50 0	9. 68213	17	10. 31787	9. 73927	23	10. 26073	10. 05714	5	9. 94286	15
46	9 52	50 8	68237	18	31763	73957	23	26043	05721	5	94279	14
47	9 44	50 16	68260	18	31740	73987	24	26013	05727	5	94273	13
48	9 36	50 24	68283	19	31717	74017	24	25983	05734	5	94266	12
49	9 28	50 32	68305	19	31695	74047	25	25953	05741	6	94259	11
50	8 9 20	3 50 40	9. 68328	19	10. 31672	9. 74077	25	10. 25923	10. 05748	6	9. 94252	10
51	9 12	50 48	68351	20	31649	74107	26	25893	05755	6	94245	9
52	9 4	50 56	68374	20	31626	74137	26	25863	05762	6	94238	8
53	8 56	51 4	68397	21	31603	74166	27	25834	05769	6	94231	7
54	8 48	51 12	68420	21	31580	74196	27	25804	05776	6	94224	6
55	8 8 40	3 51 20	9. 68443	21	10. 31557	9. 74226	28	10. 25774	10. 05783	6	9. 94217	5
56	8 32	51 28	68466	22	31534	74256	28	25744	05790	6	94210	4
57	8 24	51 36	68489	22	31511	74286	29	25714	05797	7	94203	3
58	8 16	51 44	68512	22	31488	74316	29	25684	05804	7	94196	2
59	8 8	51 52	68534	23	31466	74345	30	25655	05811	7	94189	1
60	8 0	52 0	68557	23	31443	74375	30	25625	05818	7	94182	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M
118°			A		A	B		B	C		C	61°

Seconds of time		1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols.	A	3	6	9	12	15	17	20
	B	4	8	11	15	19	23	26
	C	1	2	3	3	4	5	6

TABLE 44.

Log. Sines, Tangents, and Secants.

29°			A		A	B		B	C		C	150°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	8 8 0	3 52 0	9. 68557	0	10. 31443	9. 74375	0	10. 25625	10. 05818	0	9. 94182	60
1	7 52	52 8	68580	0	31420	74405	0	25595	05825	0	94175	59
2	7 44	52 16	68603	1	31397	74435	1	25565	05832	0	94168	58
3	7 36	52 24	68625	1	31375	74465	1	25535	05839	0	94161	57
4	7 28	52 32	68648	1	31352	74494	2	25506	05846	0	94154	56
5	8 7 20	3 52 40	9. 68671	2	10. 31329	9. 74524	2	10. 25476	10. 05853	1	9. 94147	55
6	7 12	52 48	68694	2	31306	74554	3	25446	05860	1	94140	54
7	7 4	52 56	68716	3	31284	74583	3	25417	05867	1	94133	53
8	6 56	53 4	68739	3	31261	74613	4	25387	05874	1	94126	52
9	6 48	53 12	68762	3	31238	74643	4	25357	05881	1	94119	51
10	8 6 40	3 53 20	9. 68784	4	10. 31216	9. 74673	5	10. 25327	10. 05888	1	9. 94112	50
11	6 32	53 28	68807	4	31193	74702	5	25298	05895	1	94105	49
12	6 24	53 36	68829	4	31171	74732	6	25268	05902	1	94098	48
13	6 16	53 44	68852	5	31148	74762	6	25238	05910	2	94090	47
14	6 8	53 52	68875	5	31125	74791	7	25209	05917	2	94083	46
15	8 6 0	3 54 0	9. 68897	6	10. 31103	9. 74821	7	10. 25179	10. 05924	2	9. 94076	45
16	5 52	54 8	68920	6	31080	74851	8	25149	05931	2	94069	44
17	5 44	54 16	68942	6	31058	74880	8	25120	05938	2	94062	43
18	5 36	54 24	68965	7	31035	74910	9	25090	05945	2	94055	42
19	5 28	54 32	68987	7	31013	74939	9	25061	05952	2	94048	41
20	8 5 20	3 54 40	9. 69010	7	10. 30990	9. 74969	10	10. 25031	10. 05959	2	9. 94041	40
21	5 12	54 48	69032	8	30968	74998	10	25002	05966	3	94034	39
22	5 4	54 56	69055	8	30945	75028	11	24972	05973	3	94027	38
23	4 56	55 4	69077	9	30923	75058	11	24942	05980	3	94020	37
24	4 48	55 12	69100	9	30900	75087	12	24913	05988	3	94012	36
25	8 4 40	3 55 20	9. 69122	9	10. 30878	9. 75117	12	10. 24883	10. 05995	3	9. 94005	35
26	4 32	55 28	69144	10	30856	75146	13	24854	06002	3	93998	34
27	4 24	55 36	69167	10	30833	75176	13	24824	06009	3	93991	33
28	4 16	55 44	69189	10	30811	75205	14	24795	06016	3	93984	32
29	4 8	55 52	69212	11	30788	75235	14	24765	06023	3	93977	31
30	8 4 0	3 56 0	9. 69234	11	10. 30766	9. 75264	15	10. 24736	10. 06030	4	9. 93970	30
31	3 52	56 8	69256	12	30744	75294	15	24706	06037	4	93963	29
32	3 44	56 16	69279	12	30721	75323	16	24677	06045	4	93955	28
33	3 36	56 24	69301	12	30699	75353	16	24647	06052	4	93948	27
34	3 28	56 32	69323	13	30677	75382	17	24618	06059	4	93941	26
35	8 3 20	3 56 40	9. 69345	13	10. 30655	9. 75411	17	10. 24589	10. 06066	4	9. 93934	25
36	3 12	56 48	69368	13	30632	75441	18	24559	06073	4	93927	24
37	3 4	56 56	69390	14	30610	75470	18	24530	06080	4	93920	23
38	2 56	57 4	69412	14	30588	75500	19	24500	06088	5	93912	22
39	2 48	57 12	69434	15	30566	75529	19	24471	06095	5	93905	21
40	8 2 40	3 57 20	9. 69456	15	10. 30544	9. 75558	20	10. 24442	10. 06102	5	9. 93898	20
41	2 32	57 28	69479	15	30521	75588	20	24412	06109	5	93891	19
42	2 24	57 36	69501	16	30499	75617	21	24383	06116	5	93884	18
43	2 16	57 44	69523	16	30477	75647	21	24353	06124	5	93876	17
44	2 8	57 52	69545	16	30455	75676	22	24324	06131	5	93869	16
45	8 2 0	3 58 0	9. 69567	17	10. 30433	9. 75705	22	10. 24295	10. 06138	5	9. 93862	15
46	1 52	58 8	69589	17	30411	75735	23	24265	06145	5	93855	14
47	1 44	58 16	69611	17	30389	75764	23	24236	06153	6	93847	13
48	1 36	58 24	69633	18	30367	75793	24	24207	06160	6	93840	12
49	1 28	58 32	69655	18	30345	75822	24	24178	06167	6	93833	11
50	8 1 20	3 58 40	9. 69677	19	10. 30323	9. 75852	25	10. 24148	10. 06174	6	9. 93826	10
51	1 12	58 48	69699	19	30301	75881	25	24119	06181	6	93819	9
52	1 4	58 56	69721	19	30279	75910	26	24090	06189	6	93811	8
53	0 56	59 4	69743	20	30257	75939	26	24061	06196	6	93804	7
54	0 48	59 12	69765	20	30235	75969	27	24031	06203	6	93797	6
55	8 0 40	3 59 20	9. 69787	20	10. 30213	9. 75998	27	10. 24002	10. 06211	7	9. 93789	5
56	0 32	59 28	69809	21	30191	76027	28	23973	06218	7	93782	4
57	0 24	59 36	69831	21	30169	76056	28	23944	06225	7	93775	3
58	0 16	59 44	69853	22	30147	76086	29	23914	06232	7	93768	2
59	0 8	59 52	69875	22	30125	76115	29	23885	06240	7	93760	1
60	0 0	4 0 0	69897	22	30103	76144	29	23856	06247	7	93753	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
119°			A		A	B		B	C		C	60°

Seconds of time		1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols.	A	3	6	8	11	14	17	20
	B	4	7	11	15	18	22	26
	C	1	2	3	4	4	5	6

TABLE 44.

Log. Sines, Tangents, and Secants.

30°			A		A	B		B	C		C	149°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	8 0 0	4 0 0	9. 69897	0	10. 30103	9. 76144	0	10. 23856	10. 06247	0	9. 93753	60
1	7 59 52	0 8	69919	0	30081	76173	0	23827	06254	0	93746	59
2	59 44	0 16	69941	1	30059	76202	1	23798	06262	0	93738	58
3	59 36	0 24	69963	1	30037	76231	1	23769	06269	0	93731	57
4	59 28	0 32	69984	1	30016	76261	2	23739	06276	0	93724	56
5	7 59 20	4 0 40	9. 70006	2	10. 29994	9. 76290	2	10. 23710	10. 06283	1	9. 93717	55
6	59 12	0 48	70028	2	29972	76319	3	23681	06291	1	93709	54
7	59 4	0 56	70050	3	29950	76348	3	23652	06298	1	93702	53
8	58 56	1 4	70072	3	29928	76377	4	23623	06305	1	93695	52
9	58 48	1 12	70093	3	29907	76406	4	23594	06313	1	93687	51
10	7 58 40	4 1 20	9. 70115	4	10. 29885	9. 76435	5	10. 23565	10. 06320	1	9. 93680	50
11	58 32	1 28	70137	4	29863	76464	5	23536	06327	1	93673	49
12	58 24	1 36	70159	4	29841	76493	6	23507	06335	1	93665	48
13	58 16	1 44	70180	5	29820	76522	6	23478	06342	2	93658	47
14	58 8	1 52	70202	5	29798	76551	7	23449	06350	2	93650	46
15	7 58 0	4 2 0	9. 70224	5	10. 29776	9. 76580	7	10. 23420	10. 06357	2	9. 93643	45
16	57 52	2 8	70245	6	29755	76609	8	23391	06364	2	93636	44
17	57 44	2 16	70267	6	29733	76639	8	23361	06372	2	93628	43
18	57 36	2 24	70288	6	29712	76668	9	23332	06379	2	93621	42
19	57 28	2 32	70310	7	29690	76697	9	23303	06386	2	93614	41
20	7 57 20	4 2 40	9. 70332	7	10. 29668	9. 76725	10	10. 23275	10. 06394	2	9. 93606	40
21	57 12	2 48	70353	8	29647	76754	10	23246	06401	3	93599	39
22	57 4	2 56	70375	8	29625	76783	11	23217	06409	3	93591	38
23	56 56	3 4	70396	8	29604	76812	11	23188	06416	3	93584	37
24	56 48	3 12	70418	9	29582	76841	12	23159	06423	3	93577	36
25	7 56 40	4 3 20	9. 70439	9	10. 29561	9. 76870	12	10. 23130	10. 06431	3	9. 93569	35
26	56 32	3 28	70461	9	29539	76899	13	23101	06438	3	93562	34
27	56 24	3 36	70482	10	29518	76928	13	23072	06446	3	93554	33
28	56 16	3 44	70504	10	29496	76957	13	23043	06453	3	93547	32
29	56 8	3 52	70525	10	29475	76986	14	23014	06461	4	93539	31
30	7 56 0	4 4 0	9. 70547	11	10. 29453	9. 77015	14	10. 22985	10. 06468	4	9. 93532	30
31	55 52	4 8	70568	11	29432	77044	15	22956	06475	4	93525	29
32	55 44	4 16	70590	11	29410	77073	15	22927	06483	4	93517	28
33	55 36	4 24	70611	12	29389	77101	16	22899	06490	4	93510	27
34	55 28	4 32	70633	12	29367	77130	16	22870	06498	4	93502	26
35	7 55 20	4 4 40	9. 70654	13	10. 29346	9. 77159	17	10. 22841	10. 06505	4	9. 93495	25
36	55 12	4 48	70675	13	29325	77188	17	22812	06513	4	93487	24
37	55 4	4 56	70697	13	29303	77217	18	22783	06520	5	93480	23
38	54 56	5 4	70718	14	29282	77246	18	22754	06528	5	93472	22
39	54 48	5 12	70739	14	29261	77274	19	22726	06535	5	93465	21
40	7 54 40	4 5 20	9. 70761	14	10. 29239	9. 77303	19	10. 22697	10. 06543	5	9. 93457	20
41	54 32	5 28	70782	15	29218	77332	20	22668	06550	5	93450	19
42	54 24	5 36	70803	15	29197	77361	20	22639	06558	5	93442	18
43	54 16	5 44	70824	15	29176	77390	21	22610	06565	5	93435	17
44	54 8	5 52	70846	16	29154	77418	21	22582	06573	5	93427	16
45	7 54 0	4 6 0	9. 70867	16	10. 29133	9. 77447	22	10. 22553	10. 06580	6	9. 93420	15
46	53 52	6 8	70888	16	29112	77476	22	22524	06588	6	93412	14
47	53 44	6 16	70909	17	29091	77505	23	22495	06595	6	93405	13
48	53 36	6 24	70931	17	29069	77533	23	22467	06603	6	93397	12
49	53 28	6 32	70952	18	29048	77562	24	22438	06610	6	93390	11
50	7 53 20	4 6 40	9. 70973	18	10. 29027	9. 77591	24	10. 22409	10. 06618	6	9. 93382	10
51	53 12	6 48	70994	18	29006	77619	25	22381	06625	6	93375	9
52	53 4	6 56	71015	19	28985	77648	25	22352	06633	6	93367	8
53	52 56	7 4	71036	19	28964	77677	26	22323	06640	7	93360	7
54	52 48	7 12	71058	19	28942	77706	26	22294	06648	7	93352	6
55	7 52 40	4 7 20	9. 71079	20	10. 28921	9. 77734	26	10. 22266	10. 06656	7	9. 93344	5
56	52 32	7 28	71100	20	28900	77763	27	22237	06663	7	93337	4
57	52 24	7 36	71121	20	28879	77791	27	22209	06671	7	93329	3
58	52 16	7 44	71142	21	28858	77820	28	22180	06678	7	93322	2
59	52 8	7 52	71163	21	28837	77849	28	22151	06686	7	93314	1
60	52 0	8 0	71184	21	28816	77877	29	22123	06693	7	93307	0
M.	Hour P. M	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
120°			A		A	B		B	C		C	59°

Seconds of time		1ˢ	2ˢ	3ˢ	4ˢ	5ˢ	6ˢ	7ˢ
Prop. parts of cols.	A	3	5	8	11	13	16	19
	B	4	7	11	14	18	22	25
	C	1	2	3	4	5	6	7

TABLE 44.

Log. Sines, Tangents, and Secants.

31°			A		A	B		B	C		C	148°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	7 52 0	4 8 0	9. 71184	0	10. 28816	9. 77877	0	10. 22123	10. 06693	0	9. 93307	60
1	51 52	8 8	71205	0	28795	77906	0	22094	06701	0	93299	59
2	51 44	8 16	71226	1	28774	77935	1	22065	06709	0	93291	58
3	51 36	8 24	71247	1	28753	77963	1	22037	06716	0	93284	57
4	51 28	8 32	71268	1	28732	77992	2	22008	06724	1	93276	56
5	7 51 20	4 8 40	9. 71289	2	10. 28711	9. 78020	2	10. 21980	10. 06731	1	9. 93269	55
6	51 12	8 48	71310	2	28690	78049	3	21951	06739	1	93261	54
7	51 4	8 56	71331	2	28669	78077	3	21923	06747	1	93253	53
8	50 56	9 4	71352	3	28648	78106	4	21894	06754	1	93246	52
9	50 48	9 12	71373	3	28627	78135	4	21865	06762	1	93238	51
10	7 50 40	4 9 20	9. 71393	3	10. 28607	9. 78163	5	10. 21837	10. 06770	1	9. 93230	50
11	50 32	9 28	71414	4	28586	78192	5	21808	06777	1	93223	49
12	50 24	9 36	71435	4	28565	78220	6	21780	06785	2	93215	48
13	50 16	9 44	71456	4	28544	78249	6	21751	06793	2	93207	47
14	50 8	9 52	71477	5	28523	78277	7	21723	06800	2	93200	46
15	7 50 0	4 10 0	9. 71498	5	10. 28502	9. 78306	7	10. 21694	10. 06808	2	9. 93192	45
16	49 52	10 8	71519	5	28481	78334	8	21666	06816	2	93184	44
17	49 44	10 16	71539	6	28461	78363	8	21637	06823	2	93177	43
18	49 36	10 24	71560	6	28440	78391	9	21609	06831	2	93169	42
19	49 28	10 32	71581	7	28419	78419	9	21581	06839	2	93161	41
20	7 49 20	4 10 40	9. 71602	7	10. 28398	9. 78448	9	10. 21552	10. 06846	3	9. 93154	40
21	49 12	10 48	71622	7	28378	78476	10	21524	06854	3	93146	39
22	49 4	10 56	71643	8	28357	78505	10	21495	06862	3	93138	38
23	48 56	11 4	71664	8	28336	78533	11	21467	06869	3	93131	37
24	48 48	11 12	71685	8	28315	78562	11	21438	06877	3	93123	36
25	7 48 40	4 11 20	9. 71705	9	10. 28295	9. 78590	12	10. 21410	10. 06885	3	9. 93115	35
26	48 32	11 28	71726	9	28274	78618	12	21382	06892	3	93108	34
27	48 24	11 36	71747	9	28253	78647	13	21353	06900	3	93100	33
28	48 16	11 44	71767	10	28233	78675	13	21325	06908	4	93092	32
29	48 8	11 52	71788	10	28212	78704	14	21296	06916	4	93084	31
30	7 48 0	4 12 0	9. 71809	10	10. 28191	9. 78732	14	10. 21268	10. 06923	4	9. 93077	30
31	47 52	12 8	71829	11	28171	78760	15	21240	06931	4	93069	29
32	47 44	12 16	71850	11	28150	78789	15	21211	06939	4	93061	28
33	47 36	12 24	71870	11	28130	78817	16	21183	06947	4	93053	27
34	47 28	12 32	71891	12	28109	78845	16	21155	06954	4	93046	26
35	7 47 20	4 12 40	9. 71911	12	10. 28089	9. 78874	17	10. 21126	10. 06962	5	9. 93038	25
36	47 12	12 48	71932	12	28068	78902	17	21098	06970	5	93030	24
37	47 4	12 56	71952	13	28048	78930	17	21070	06978	5	93022	23
38	46 56	13 4	71973	13	28027	78959	18	21041	06986	5	93014	22
39	46 48	13 12	71994	13	28006	78987	18	21013	06993	5	93007	21
40	7 46 40	4 13 20	9. 72014	14	10. 27986	9. 79015	19	10. 20985	10. 07001	5	9. 92999	20
41	46 32	13 28	72034	14	27966	79043	19	20957	07009	5	92991	19
42	46 24	13 36	72055	14	27945	79072	20	20928	07017	5	92983	18
43	46 16	13 44	72075	15	27925	79100	20	20900	07024	6	92976	17
44	46 8	13 52	72096	15	27904	79128	21	20872	07032	6	92968	16
45	7 46 0	4 14 0	9. 72116	15	10. 27884	9. 79156	21	10. 20844	10. 07040	6	9. 92960	15
46	45 52	14 8	72137	16	27863	79185	22	20815	07048	6	92952	14
47	45 44	14 16	72157	16	27843	79213	22	20787	07056	6	92944	13
48	45 36	14 24	72177	16	27823	79241	23	20759	07064	6	92936	12
49	45 28	14 32	72198	17	27802	79269	23	20731	07071	6	92929	11
50	7 45 20	4 14 40	9. 72218	17	10. 27782	9. 79297	24	10. 20703	10. 07079	6	9. 92921	10
51	45 12	14 48	72238	18	27762	79326	24	20674	07087	7	92913	9
52	45 4	14 56	72259	18	27741	79354	25	20646	07095	7	92905	8
53	44 56	15 4	72279	18	27721	79382	25	20618	07103	7	92897	7
54	44 48	15 12	72299	19	27701	79410	26	20590	07111	7	92889	6
55	7 44 40	4 15 20	9. 72320	19	10. 27680	9. 79438	26	10. 20562	10. 07119	7	9. 92881	5
56	44 32	15 28	72340	19	27660	79466	26	20534	07126	7	92874	4
57	44 24	15 36	72360	20	27640	79495	27	20505	07134	7	92866	3
58	44 16	15 44	72381	20	27619	79523	27	20477	07142	7	92858	2
59	44 8	15 52	72401	20	27599	79551	28	20449	07150	8	92850	1
60	44 0	16 0	72421	21	27579	79579	28	20421	07158	8	92842	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
121°			A		A	B		B	C		C	58°

Seconds of time		1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols.	A	3	5	8	10	13	15	18
	B	4	7	11	14	18	21	25
	C	1	2	3	4	5	6	7

TABLE 44.

Log. Sines, Tangents, and Secants.

32°			A		A	B		B	C		C	147°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	7 44 0	4 16 0	9. 72421	0	10. 27579	9. 79579	0	10. 20421	10. 07158	0	9. 92842	60
1	43 52	16 8	72441	0	27559	79607	0	20393	07166	0	92834	59
2	43 44	16 16	72461	1	27539	79635	1	20365	07174	0	92826	58
3	43 36	16 24	72482	1	27518	79663	1	20337	07182	0	92818	57
4	43 28	16 32	72502	1	27498	79691	2	20309	07190	1	92810	56
5	7 43 20	4 16 40	9. 72522	2	10. 27478	9. 79719	2	10. 20281	10. 07197	1	9. 92803	55
6	43 12	16 48	72542	2	27458	79747	3	20253	07205	1	92795	54
7	43 4	16 56	72562	2	27438	79776	3	20224	07213	1	92787	53
8	42 56	17 4	72582	3	27418	79804	4	20196	07221	1	92779	52
9	42 48	17 12	72602	3	27398	79832	4	20168	07229	1	92771	51
10	7 42 40	4 17 20	9. 72622	3	10. 27378	9. 79860	5	10. 20140	10. 07237	1	9. 92763	50
11	42 32	17 28	72643	4	27357	79888	5	20112	07245	1	92755	49
12	42 24	17 36	72663	4	27337	79916	6	20084	07253	2	92747	48
13	42 16	17 44	72683	4	27317	79944	6	20056	07261	2	92739	47
14	42 8	17 52	72703	5	27297	79972	7	20028	07269	2	92731	46
15	7 42 0	4 18 0	9. 72723	5	10. 27277	9. 80000	7	10. 20000	10. 07277	2	9. 92723	45
16	41 52	18 8	72743	5	27257	80028	7	19972	07285	2	92715	44
17	41 44	18 16	72763	6	27237	80056	8	19944	07293	2	92707	43
18	41 36	18 24	72783	6	27217	80084	8	19916	07301	2	92699	42
19	41 28	18 32	72803	6	27197	80112	9	19888	07309	3	92691	41
20	7 41 20	4 18 40	9. 72823	7	10. 27177	9. 80140	9	10. 19860	10. 07317	3	9. 92683	40
21	41 12	18 48	72843	7	27157	80168	10	19832	07325	3	92675	39
22	41 4	18 56	72863	7	27137	80195	10	19805	07333	3	92667	38
23	40 56	19 4	72883	8	27117	80223	11	19777	07341	3	92659	37
24	40 48	19 12	72902	8	27098	80251	11	19749	07349	3	92651	36
25	7 40 40	4 19 20	9. 72922	8	10. 27078	9. 80279	12	10. 19721	10. 07357	3	9. 92643	35
26	40 32	19 28	72942	9	27058	80307	12	19693	07365	3	92635	34
27	40 24	19 36	72962	9	27038	80335	13	19665	07373	4	92627	33
28	40 16	19 44	72982	9	27018	80363	13	19637	07381	4	92619	32
29	40 8	19 52	73002	10	26998	80391	13	19609	07389	4	92611	31
30	7 40 0	4 20 0	9. 73022	10	10. 26978	9. 80419	14	10. 19581	10. 07397	4	9. 92603	30
31	39 52	20 8	73041	10	26959	80447	14	19553	07405	4	92595	29
32	39 44	20 16	73061	11	26939	80474	15	19526	07413	4	92587	28
33	39 36	20 24	73081	11	26919	80502	15	19498	07421	4	92579	27
34	39 28	20 32	73101	11	26899	80530	16	19470	07429	5	92571	26
35	7 39 20	4 20 40	9. 73121	12	10. 26879	9. 80558	16	10. 19442	10. 07437	5	9. 92563	25
36	39 12	20 48	73140	12	26860	80586	17	19414	07445	5	92555	24
37	39 4	20 56	73160	12	26840	80614	17	19386	07454	5	92546	23
38	38 56	21 4	73180	13	26820	80642	18	19358	07462	5	92538	22
39	38 48	21 12	73200	13	26800	80669	18	19331	07470	5	92530	21
40	7 38 40	4 21 20	9. 73219	13	10. 26781	9. 80697	19	10. 19303	10. 07478	5	9. 92522	20
41	38 32	21 28	73239	14	26761	80725	19	19275	07486	6	92514	19
42	38 24	21 36	73259	14	26741	80753	20	19247	07494	6	92506	18
43	38 16	21 44	73278	14	26722	80781	20	19219	07502	6	92498	17
44	38 8	21 52	73298	15	26702	80808	20	19192	07510	6	92490	16
45	7 38 0	4 22 0	9. 73318	15	10. 26682	9. 80836	21	10. 19164	10. 07518	6	9. 92482	15
46	37 52	22 8	73337	15	26663	80864	21	19136	07527	6	92473	14
47	37 44	22 16	73357	16	26643	80892	22	19108	07535	6	92465	13
48	37 36	22 24	73377	16	26623	80919	22	19081	07543	6	92457	12
49	37 28	22 32	73396	16	26604	80947	23	19053	07551	7	92449	11
50	7 37 20	4 22 40	9. 73416	17	10. 26584	9. 80975	23	10. 19025	10. 07559	7	9. 92441	10
51	37 12	22 48	73435	17	26565	81003	24	18997	07567	7	92433	9
52	37 4	22 56	73455	17	26545	81030	24	18970	07575	7	92425	8
53	36 56	23 4	73474	18	26526	81058	25	18942	07584	7	92416	7
54	36 48	23 12	73494	18	26506	81086	25	18914	07592	7	92408	6
55	7 36 40	4 23 20	9. 73513	18	10. 26487	9. 81113	26	10. 18887	10. 07600	7	9. 92400	5
56	36 32	23 28	73533	19	26467	81141	26	18859	07608	8	92392	4
57	36 24	23 36	73552	19	26448	81169	26	18831	07616	8	92384	3
58	36 16	23 44	73572	19	26428	81196	27	18804	07624	8	92376	2
59	36 8	23 52	73591	20	26409	81224	27	18776	07633	8	92367	1
60	36 0	24 0	73611	20	26389	81252	28	18748	07641	8	92359	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
122°			A		A	B		B	C		C	57°

Seconds of time		1ˢ	2ˢ	3ˢ	4ˢ	5ˢ	6ˢ	7ˢ
Prop. parts of cols.	A	2	5	7	10	12	15	17
	B	3	7	10	14	17	21	24
	C	1	2	3	4	5	6	7

TABLE 44.

Log. Sines, Tangents, and Secants.

33°			A		A	B		B	C		C	146°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	7 36 0	4 24 0	9. 73611	0	10. 26389	9. 81252	0	10. 18748	10. 07641	0	9. 92359	60
1	35 52	24 8	73630	0	26370	81279	0	18721	07649	0	92351	59
2	35 44	24 16	73650	1	26350	81307	1	18693	07657	0	92343	58
3	35 36	24 24	73669	1	26331	81335	1	18665	07665	0	92335	57
4	35 28	24 32	73689	1	26311	81362	2	18638	07674	1	92326	56
5	7 35 20	4 24 40	9. 73708	2	10. 26292	9. 81390	2	10. 18610	10. 07682	1	9. 92318	55
6	35 12	24 48	73727	2	26273	81418	3	18582	07690	1	92310	54
7	35 4	24 56	73747	2	26253	81445	3	18555	07698	1	92302	53
8	34 56	25 4	73766	3	26234	81473	4	18527	07707	1	92293	52
9	34 48	25 12	73785	3	26215	81500	4	18500	07715	1	92285	51
10	7 34 40	4 25 20	9. 73805	3	10. 26195	9. 81528	5	10. 18472	10. 07723	1	9. 92277	50
11	34 32	25 28	73824	3	26176	81556	5	18444	07731	2	92269	49
12	34 24	25 36	73843	4	26157	81583	5	18417	07740	2	92260	48
13	34 16	25 44	73863	4	26137	81611	6	18389	07748	2	92252	47
14	34 8	25 52	73882	4	26118	81638	6	18362	07756	2	92244	46
15	7 34 0	4 26 0	9. 73901	5	10. 26099	9. 81666	7	10. 18334	10. 07765	2	9. 92235	45
16	33 52	26 8	73921	5	26079	81693	7	18307	07773	2	92227	44
17	33 44	26 16	73940	5	26060	81721	8	18279	07781	2	92219	43
18	33 36	26 24	73959	6	26041	81748	8	18252	07789	3	92211	42
19	33 28	26 32	73978	6	26022	81776	9	18224	07798	3	92202	41
20	7 33 20	4 26 40	9. 73997	6	10. 26003	9. 81803	9	10. 18197	10. 07806	3	9. 92194	40
21	33 12	26 48	74017	7	25983	81831	10	18169	07814	3	92186	39
22	33 4	26 56	74036	7	25964	81858	10	18142	07823	3	92177	38
23	32 56	27 4	74055	7	25945	81886	11	18114	07831	3	92169	37
24	32 48	27 12	74074	8	25926	81913	11	18087	07839	3	92161	36
25	7 32 40	4 27 20	9. 74093	8	10. 25907	9. 81941	11	10. 18059	10. 07848	3	9. 92152	35
26	32 32	27 28	74113	8	25887	81968	12	18032	07856	4	92144	34
27	32 24	27 36	74132	9	25868	81996	12	18004	07864	4	92136	33
28	32 16	27 44	74151	9	25849	82023	13	17977	07873	4	92127	32
29	32 8	27 52	74170	9	25830	82051	13	17949	07881	4	92119	31
30	7 32 0	4 28 0	9. 74189	10	10. 25811	9. 82078	14	10. 17922	10. 07889	4	9. 92111	30
31	31 52	28 8	74208	10	25792	82106	14	17894	07898	4	92102	29
32	31 44	28 16	74227	10	25773	82133	15	17867	07906	4	92094	28
33	31 36	28 24	74246	10	25754	82161	15	17839	07914	5	92086	27
34	31 28	28 32	74265	11	25735	82188	16	17812	07923	5	92077	26
35	7 31 20	4 28 40	9. 74284	11	10. 25716	9. 82215	16	10. 17785	10. 07931	5	9. 92069	25
36	31 12	28 48	74303	11	25697	82243	16	17757	07940	5	92060	24
37	31 4	28 56	74322	12	25678	82270	17	17730	07948	5	92052	23
38	30 56	29 4	74341	12	25659	82298	17	17702	07956	5	92044	22
39	30 48	29 12	74360	12	25640	82325	18	17675	07965	5	92035	21
40	7 30 40	4 29 20	9. 74379	13	10. 25621	9. 82352	18	10. 17648	10. 07973	6	9. 92027	20
41	30 32	29 28	74398	13	25602	82380	19	17620	07982	6	92018	19
42	30 24	29 36	74417	13	25583	82407	19	17593	07990	6	92010	18
43	30 16	29 44	74436	14	25564	82435	20	17565	07998	6	92002	17
44	30 8	29 52	74455	14	25545	82462	20	17538	08007	6	91993	16
45	7 30 0	4 30 0	9. 74474	14	10. 25526	9. 82489	21	10. 17511	10. 08015	6	9. 91985	15
46	29 52	30 8	74493	15	25507	82517	21	17483	08024	6	91976	14
47	29 44	30 16	74512	15	25488	82544	22	17456	08032	7	91968	13
48	29 36	30 24	74531	15	25469	82571	22	17429	08041	7	91959	12
49	29 28	30 32	74549	16	25451	82599	22	17401	08049	7	91951	11
50	7 29 20	4 30 40	9. 74568	16	10. 25432	9. 82626	23	10. 17374	10. 08058	7	9. 91942	10
51	29 12	30 48	74587	16	25413	82653	23	17347	08066	7	91934	9
52	29 4	30 56	74606	17	25394	82681	24	17319	08075	7	91925	8
53	28 56	31 4	74625	17	25375	82708	24	17292	08083	7	91917	7
54	28 48	31 12	74644	17	25356	82735	25	17265	08092	8	91908	6
55	7 28 40	4 31 20	9. 74662	17	10. 25338	9. 82762	25	10. 17238	10. 08100	8	9. 91900	5
56	28 32	31 28	74681	18	25319	82790	26	17210	08109	8	91891	4
57	28 24	31 36	74700	18	25300	82817	26	17183	08117	8	91883	3
58	28 16	31 44	74719	18	25281	82844	27	17156	08126	8	91874	2
59	28 8	31 52	74737	19	25263	82871	27	17129	08134	8	91866	1
60	28 0	32 0	74756	19	25244	82899	27	17101	08143	8	91857	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
123°			A		A	B		B	C		C	56°

Seconds of time.......		1ˢ	2ˢ	3ˢ	4ˢ	5ˢ	6ˢ	7ˢ
Prop. parts of cols.	A	2	5	7	10	12	14	17
	B	3	7	10	14	17	21	24
	C	1	2	3	4	5	6	7

TABLE 44.

Log. Sines, Tangents, and Secants.

34°			A		A	B		B	C		C	145°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	7 28 0	4 32 0	9. 74756	0	10. 25244	9. 82899	0	10. 17101	10. 08143	0	9. 91857	60
1	27 52	32 8	74775	0	25225	82926	0	17074	08151	0	91849	59
2	27 44	32 16	74794	1	25206	82953	1	17047	08160	0	91840	58
3	27 36	32 24	74812	1	25188	82980	1	17020	08168	0	91832	57
4	27 28	32 32	74831	1	25169	83008	2	16992	08177	1	91823	56
5	7 27 20	4 32 40	9. 74850	2	10. 25150	9. 83035	2	10. 16965	10. 08185	1	9. 91815	55
6	27 12	32 48	74868	2	25132	83062	3	16938	08194	1	91806	54
7	27 4	32 56	74887	2	25113	83089	3	16911	08202	1	91798	53
8	26 56	33 4	74906	2	25094	83117	4	16883	08211	1	91789	52
9	26 48	33 12	74924	3	25076	83144	4	16856	08219	1	91781	51
10	7 26 40	4 33 20	9. 74943	3	10. 25057	9. 83171	5	10. 16829	10. 08228	1	9. 91772	50
11	26 32	33 28	74961	3	25039	83198	5	16802	08237	2	91763	49
12	26 24	33 36	74980	4	25020	83225	5	16775	08245	2	91755	48
13	26 16	33 44	74999	4	25001	83252	6	16748	08254	2	91746	47
14	26 8	33 52	75017	4	24983	83280	6	16720	08262	2	91738	46
15	7 26 0	4 34 0	9. 75036	5	10. 24964	9. 83307	7	10. 16693	10. 08271	2	9. 91729	45
16	25 52	34 8	75054	5	24946	83334	7	16666	08280	2	91720	44
17	25 44	34 16	75073	5	24927	83361	8	16639	08288	2	91712	43
18	25 36	34 24	75091	6	24909	83388	8	16612	08297	3	91703	42
19	25 28	34 32	75110	6	24890	83415	9	16585	08305	3	91695	41
20	7 25 20	4 34 40	9. 75128	6	10. 24872	9. 83442	9	10. 16558	10. 08314	3	9. 91686	40
21	25 12	34 48	75147	6	24853	83470	9	16530	08323	3	91677	39
22	25 4	34 56	75165	7	24835	83497	10	16503	08331	3	91669	38
23	24 56	35 4	75184	7	24816	83524	10	16476	08340	3	91660	37
24	24 48	35 12	75202	7	24798	83551	11	16449	08349	3	91651	36
25	7 24 40	4 35 20	9. 75221	8	10. 24779	9. 83578	11	10. 16422	10. 08357	4	9. 91643	35
26	24 32	35 28	75239	8	24761	83605	12	16395	08366	4	91634	34
27	24 24	35 36	75258	8	24742	83632	12	16368	08375	4	91625	33
28	24 16	35 44	75276	9	24724	83659	13	16341	08383	4	91617	32
29	24 8	35 52	75294	9	24706	83686	13	16314	08392	4	91608	31
30	7 24 0	4 36 0	9. 75313	9	10. 24687	9. 83713	14	10. 16287	10. 08401	4	9. 91599	30
31	23 52	36 8	75331	9	24669	83740	14	16260	08409	4	91591	29
32	23 44	36 16	75350	10	24650	83768	14	16232	08418	5	91582	28
33	23 36	36 24	75368	10	24632	83795	15	16205	08427	5	91573	27
34	23 28	36 32	75386	10	24614	83822	15	16178	08435	5	91565	26
35	7 23 20	4 36 40	9. 75405	11	10. 24595	9. 83849	16	10. 16151	10. 08444	5	9. 91556	25
36	23 12	36 48	75423	11	24577	83876	16	16124	08453	5	91547	24
37	23 4	36 56	75441	11	24559	83903	17	16097	08462	5	91538	23
38	22 56	37 4	75459	12	24541	83930	17	16070	08470	5	91530	22
39	22 48	37 12	75478	12	24522	83957	18	16043	08479	6	91521	21
40	7 22 40	4 37 20	9. 75496	12	10. 24504	9. 83984	18	10. 16016	10. 08488	6	9. 91512	20
41	22 32	37 28	75514	13	24486	84011	18	15989	08496	6	91504	19
42	22 24	37 36	75533	13	24467	84038	19	15962	08505	6	91495	18
43	22 16	37 44	75551	13	24449	84065	19	15935	08514	6	91486	17
44	22 8	37 52	75569	13	24431	84092	20	15908	08523	6	91477	16
45	7 22 0	4 38 0	9. 75587	14	10. 24413	9. 84119	20	10. 15881	10. 08531	7	9. 91469	15
46	21 52	38 8	75605	14	24395	84146	21	15854	08540	7	91460	14
47	21 44	38 16	75624	14	24376	84173	21	15827	08549	7	91451	13
48	21 36	38 24	75642	15	24358	84200	22	15800	08558	7	91442	12
49	21 28	38 32	75660	15	24340	84227	22	15773	08567	7	91433	11
50	7 21 20	4 38 40	9. 75678	15	10. 24322	9. 84254	23	10. 15746	10. 08575	7	9. 91425	10
51	21 12	38 48	75696	16	24304	84280	23	15720	08584	7	91416	9
52	21 4	38 56	75714	16	24286	84307	23	15693	08593	8	91407	8
53	20 56	39 4	75733	16	24267	84334	24	15666	08602	8	91398	7
54	20 48	39 12	75751	17	24249	84361	24	15639	08611	8	91389	6
55	7 20 40	4 39 20	9. 75769	17	10. 24231	9. 84388	25	10. 15612	10. 08619	8	9. 91381	5
56	20 32	39 28	75787	17	24213	84415	25	15585	08628	8	91372	4
57	20 24	39 36	75805	17	24195	84442	26	15558	08637	8	91363	3
58	20 16	39 44	75823	18	24177	84469	26	15531	08646	8	91354	2
59	20 8	39 52	75841	18	24159	84496	27	15504	08655	9	91345	1
60	20 0	40 0	75859	18	24141	84523	27	15477	08664	9	91336	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
124°			A		A	B		B	C		C	55

Seconds of time		1ˢ	2ˢ	3ˢ	4ˢ	5ˢ	6ˢ	7ˢ
Prop. parts of cols.	A	2	5	7	9	11	14	16
	B	3	7	10	14	17	20	24
	C	1	2	3	4	5	7	8

TABLE 44.

Log. Sines, Tangents, and Secants.

35°			A		A	B		B	C		C	144°
M.	Hour A.M.	Hour P.M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	7 20 0	4 40 0	9.75859	0	10.24141	9.84523	0	10.15477	10.08664	0	9.91336	60
1	19 52	40 8	75877	0	24123	84550	0	15450	08672	0	91328	59
2	19 44	40 16	75895	1	24105	84576	1	15424	08681	0	91319	58
3	19 36	40 24	75913	1	24087	84603	1	15397	08690	0	91310	57
4	19 28	40 32	75931	1	24069	84630	2	15370	08699	1	91301	56
5	7 19 20	4 40 40	9.75949	1	10.24051	9.84657	2	10.15343	10.08708	1	9.91292	55
6	19 12	40 48	75967	2	24033	84684	3	15316	08717	1	91283	54
7	19 4	40 56	75985	2	24015	84711	3	15289	08726	1	91274	53
8	18 56	41 4	76003	2	23997	84738	4	15262	08734	1	91266	52
9	18 48	41 12	76021	3	23979	84764	4	15236	08743	1	91257	51
10	7 18 40	4 41 20	9.76039	3	10.23961	9.84791	4	10.15209	10.08752	2	9.91248	50
11	18 32	41 28	76057	3	23943	84818	5	15182	08761	2	91239	49
12	18 24	41 36	76075	4	23925	84845	5	15155	08770	2	91230	48
13	18 16	41 44	76093	4	23907	84872	6	15128	08779	2	91221	47
14	18 8	41 52	76111	4	23889	84899	6	15101	08788	2	91212	46
15	7 18 0	4 42 0	9.76129	4	10.23871	9.84925	7	10.15075	10.08797	2	9.91203	45
16	17 52	42 8	76146	5	23854	84952	7	15048	08806	2	91194	44
17	17 44	42 16	76164	5	23836	84979	8	15021	08815	3	91185	43
18	17 36	42 24	76182	5	23818	85006	8	14994	08824	3	91176	42
19	17 28	42 32	76200	6	23800	85033	8	14967	08833	3	91167	41
20	7 17 20	4 42 40	9.76218	6	10.23782	9.85059	9	10.14941	10.08842	3	9.91158	40
21	17 12	42 48	76236	6	23764	85086	9	14914	08851	3	91149	39
22	17 4	42 56	76253	6	23747	85113	10	14887	08859	3	91141	38
23	16 56	43 4	76271	7	23729	85140	10	14860	08868	3	91132	37
24	16 48	43 12	76289	7	23711	85166	11	14834	08877	4	91123	36
25	7 16 40	4 43 20	9.76307	7	10.23693	9.85193	11	10.14807	10.08886	4	9.91114	35
26	16 32	43 28	76324	8	23676	85220	12	14780	08895	4	91105	34
27	16 24	43 36	76342	8	23658	85247	12	14753	08904	4	91096	33
28	16 16	43 44	76360	8	23640	85273	12	14727	08913	4	91087	32
29	16 8	43 52	76378	9	23622	85300	13	14700	08922	4	91078	31
30	7 16 0	4 44 0	9.76395	9	10.23605	9.85327	13	10.14673	10.08931	5	9.91069	30
31	15 52	44 8	76413	9	23587	85354	14	14646	08940	5	91060	29
32	15 44	44 16	76431	9	23569	85380	14	14620	08949	5	91051	28
33	15 36	44 24	76448	10	23552	85407	15	14593	08958	5	91042	27
34	15 28	44 32	76466	10	23534	85434	15	14566	08967	5	91033	26
35	7 15 20	4 44 40	9.76484	10	10.23516	9.85460	16	10.14540	10.08977	5	9.91023	25
36	15 12	44 48	76501	11	23499	85487	16	14513	08986	5	91014	24
37	15 4	44 56	76519	11	23481	85514	16	14486	08995	6	91005	23
38	14 56	45 4	76537	11	23463	85540	17	14460	09004	6	90996	22
39	14 48	45 12	76554	12	23446	85567	17	14433	09013	6	90987	21
40	7 14 40	4 45 20	9.76572	12	10.23428	9.85594	18	10.14406	10.09022	6	9.90978	20
41	14 32	45 28	76590	12	23410	85620	18	14380	09031	6	90969	19
42	14 24	45 36	76607	12	23393	85647	19	14353	09040	6	90960	18
43	14 16	45 44	76625	13	23375	85674	19	14326	09049	6	90951	17
44	14 8	45 52	76642	13	23358	85700	20	14300	09058	7	90942	16
45	7 14 0	4 46 0	9.76660	13	10.23340	9.85727	20	10.14273	10.09067	7	9.90933	15
46	13 52	46 8	76677	14	23323	85754	20	14246	09076	7	90924	14
47	13 44	46 16	76695	14	23305	85780	21	14220	09085	7	90915	13
48	13 36	46 24	76712	14	23288	85807	21	14193	09094	7	90906	12
49	13 28	46 32	76730	14	23270	85834	22	14166	09104	7	90896	11
50	7 13 20	4 46 40	9.76747	15	10.23253	9.85860	22	10.14140	10.09113	8	9.90887	10
51	13 12	46 48	76765	15	23235	85887	23	14113	09122	8	90878	9
52	13 4	46 56	76782	15	23218	85913	23	14087	09131	8	90869	8
53	12 56	47 4	76800	16	23200	85940	24	14060	09140	8	90860	7
54	12 48	47 12	76817	16	23183	85967	24	14033	09149	8	90851	6
55	7 12 40	4 47 20	9.76835	16	10.23165	9.85993	24	10.14007	10.09158	8	9.90842	5
56	12 32	47 28	76852	17	23148	86020	25	13980	09168	8	90832	4
57	12 24	47 36	76870	17	23130	86046	25	13954	09177	9	90823	3
58	12 16	47 44	76887	17	23113	86073	26	13927	09186	9	90814	2
59	12 8	47 52	76904	17	23096	86100	26	13900	09195	9	90805	1
60	12 0	48 0	76922	18	23078	86126	27	13874	09204	9	90796	0
M.	Hour P.M.	Hour A.M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
125°			A		A	B		B	C		C	54°

Seconds of time		1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols.	A	2	4	7	9	11	13	16
	B	3	7	10	13	17	20	23
	C	1	2	3	5	6	7	8

TABLE 44.

Log. Sines, Tangents, and Secants.

36°			A		A	B		B	C		C	143°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	7 12 0	4 48 0	9.76922	0	10.23078	9.86126	0	10.13874	10.09204	0	9.90796	60
1	11 52	48 8	76939	0	23061	86153	0	13847	09213	0	90787	59
2	11 44	48 16	76957	1	23043	86179	1	13821	09223	0	90777	58
3	11 36	48 24	76974	1	23026	86206	1	13794	09232	0	90768	57
4	11 28	48 32	76991	1	23009	86232	2	13768	09241	1	90759	56
5	7 11 20	4 48 40	9.77009	1	10.22991	9.86259	2	10.13741	10.09250	1	9.90750	55
6	11 12	48 48	77026	2	22974	86285	3	13715	09259	1	90741	54
7	11 4	48 56	77043	2	22957	86312	3	13688	09269	1	90731	53
8	10 56	49 4	77061	2	22939	86338	4	13662	09278	1	90722	52
9	10 48	49 12	77078	3	22922	86365	4	13635	09287	1	90713	51
10	7 10 40	4 49 20	9.77095	3	10.22905	9.86392	4	10.13608	10.09296	2	9.90704	50
11	10 32	49 28	77112	3	22888	86418	5	13582	09306	2	90694	49
12	10 24	49 36	77130	3	22870	86445	5	13555	09315	2	90685	48
13	10 16	49 44	77147	4	22853	86471	6	13529	09324	2	90676	47
14	10 8	49 52	77164	4	22836	86498	6	13502	09333	2	90667	46
15	7 10 0	4 50 0	9.77181	4	10.22819	9.86524	7	10.13476	10.09343	2	9.90657	45
16	9 52	50 8	77199	5	22801	86551	7	13449	09352	2	90648	44
17	9 44	50 16	77216	5	22784	86577	7	13423	09361	3	90639	43
18	9 36	50 24	77233	5	22767	86603	8	13397	09370	3	90630	42
19	9 28	50 32	77250	5	22750	86630	8	13370	09380	3	90620	41
20	7 9 20	4 50 40	9.77268	6	10.22732	9.86656	9	10.13344	10.09389	3	9.90611	40
21	9 12	50 48	77285	6	22715	86683	9	13317	09398	3	90602	39
22	9 4	50 56	77302	6	22698	86709	10	13291	09408	3	90592	38
23	8 56	51 4	77319	7	22681	86736	10	13264	09417	4	90583	37
24	8 48	51 12	77336	7	22664	86762	11	13238	09426	4	90574	36
25	7 8 40	4 51 20	9.77353	7	10.22647	9.86789	11	10.13211	10.09435	4	9.90565	35
26	8 32	51 28	77370	7	22630	86815	11	13185	09445	4	90555	34
27	8 24	51 36	77387	8	22613	86842	12	13158	09454	4	90546	33
28	8 16	51 44	77405	8	22595	86868	12	13132	09463	4	90537	32
29	8 8	51 52	77422	8	22578	86894	13	13106	09473	5	90527	31
30	7 8 0	4 52 0	9.77439	9	10.22561	9.86921	13	10.13079	10.09482	5	9.90518	30
31	7 52	52 8	77456	9	22544	86947	14	13053	09491	5	90509	29
32	7 44	52 16	77473	9	22527	86974	14	13026	09501	5	90499	28
33	7 36	52 24	77490	9	22510	87000	15	13000	09510	5	90490	27
34	7 28	52 32	77507	10	22493	87027	15	12973	09520	5	90480	26
35	7 7 20	4 52 40	9.77524	10	10.22476	9.87053	15	10.12947	10.09529	5	9.90471	25
36	7 12	52 48	77541	10	22459	87079	16	12921	09538	6	90462	24
37	7 4	52 56	77558	11	22442	87106	16	12894	09548	6	90452	23
38	6 56	53 4	77575	11	22425	87132	17	12868	09557	6	90443	22
39	6 48	53 12	77592	11	22408	87158	17	12842	09566	6	90434	21
40	7 6 40	4 53 20	9.77609	11	10.22391	9.87185	18	10.12815	10.09576	6	9.90424	20
41	6 32	53 28	77626	12	22374	87211	18	12789	09585	6	90415	19
42	6 24	53 36	77643	12	22357	87238	18	12762	09595	7	90405	18
43	6 16	53 44	77660	12	22340	87264	19	12736	09604	7	90396	17
44	6 8	53 52	77677	13	22323	87290	19	12710	09614	7	90386	16
45	7 6 0	4 54 0	9.77694	13	10.22306	9.87317	20	10.12683	10.09623	7	9.90377	15
46	5 52	54 8	77711	13	22289	87343	20	12657	09632	7	90368	14
47	5 44	54 16	77728	13	22272	87369	21	12631	09642	7	90358	13
48	5 36	54 24	77744	14	22256	87396	21	12604	09651	7	90349	12
49	5 28	54 32	77761	14	22239	87422	22	12578	09661	8	90339	11
50	7 5 20	4 54 40	9.77778	14	10.22222	9.87448	22	10.12552	10.09670	8	9.90330	10
51	5 12	54 48	77795	15	22205	87475	22	12525	09680	8	90320	9
52	5 4	54 56	77812	15	22188	87501	23	12499	09689	8	90311	8
53	4 56	55 4	77829	15	22171	87527	23	12473	09699	8	90301	7
54	4 48	55 12	77846	15	22154	87554	24	12446	09708	8	90292	6
55	7 4 40	4 55 20	9.77862	16	10.22138	9.87580	24	10.12420	10.09718	9	9.90282	5
56	4 32	55 28	77879	16	22121	87606	25	12394	09727	9	90273	4
57	4 24	55 36	77896	16	22104	87633	25	12367	09737	9	90263	3
58	4 16	55 44	77913	16	22087	87659	26	12341	09746	9	90254	2
59	4 8	55 52	77930	17	22070	87685	26	12315	09756	9	90244	1
60	4 0	56 0	77946	17	22054	87711	26	12289	09765	9	90235	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
126°			A		A	B		B	C		C	53°

Seconds of time		1ˢ	2ˢ	3ˢ	4ˢ	5ˢ	6ˢ	7ˢ
Prop. parts of cols.	A	2	4	6	9	11	13	15
	B	3	7	10	13	17	20	23
	C	1	2	4	5	6	7	8

TABLE 44.

Log. Sines, Tangents, and Secants.

37°			A		A	B		B	C		C	142°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	7 4 0	4 56 0	9.77946	0	10.22054	9.87711	0	10.12289	10.09765	0	9.90235	60
1	3 52	56 8	77963	0	22037	87738	0	12262	09775	0	90225	59
2	3 44	56 16	77980	1	22020	87764	1	12236	09784	0	90216	58
3	3 36	56 24	77997	1	22003	87790	1	12210	09794	0	90206	57
4	3 28	56 32	78013	1	21987	87817	2	12183	09803	1	90197	56
5	7 3 20	4 56 40	9.78030	1	10.21970	9.87843	2	10.12157	10.09813	1	9.90187	55
6	3 12	56 48	78047	2	21953	87869	3	12131	09822	1	90178	54
7	3 4	56 56	78063	2	21937	87895	3	12105	09832	1	90168	53
8	2 56	57 4	78080	2	21920	87922	3	12078	09841	1	90159	52
9	2 48	57 12	78097	2	21903	87948	4	12052	09851	1	90149	51
10	7 2 40	4 57 20	9.78113	3	10.21887	9.87974	4	10.12026	10.09861	2	9.90139	50
11	2 32	57 28	78130	3	21870	88000	5	12000	09870	2	90130	49
12	2 24	57 36	78147	3	21853	88027	5	11973	09880	2	90120	48
13	2 16	57 44	78163	4	21837	88053	6	11947	09889	2	90111	47
14	2 8	57 52	78180	4	21820	88079	6	11921	09899	2	90101	46
15	7 2 0	4 58 0	9.78197	4	10.21803	9.88105	7	10.11895	10.09909	2	9.90091	45
16	1 52	58 8	78213	4	21787	88131	7	11869	09918	3	90082	44
17	1 44	58 16	78230	5	21770	88158	7	11842	09928	3	90072	43
18	1 36	58 24	78246	5	21754	88184	8	11816	09937	3	90063	42
19	1 28	58 32	78263	5	21737	88210	8	11790	09947	3	90053	41
20	7 1 20	4 58 40	9.78280	5	10.21720	9.88236	9	10.11764	10.09957	3	9.90043	40
21	1 12	58 48	78296	6	21704	88262	9	11738	09966	3	90034	39
22	1 4	58 56	78313	6	21687	88289	10	11711	09976	4	90024	38
23	0 56	59 4	78329	6	21671	88315	10	11685	09986	4	90014	37
24	0 48	59 12	78346	7	21654	88341	10	11659	09995	4	90005	36
25	7 0 40	4 59 20	9.78362	7	10.21638	9.88367	11	10.11633	10.10005	4	9.89995	35
26	0 32	59 28	78379	7	21621	88393	11	11607	10015	4	89985	34
27	0 24	59 36	78395	7	21605	88420	12	11580	10024	4	89976	33
28	0 16	59 44	78412	8	21588	88446	12	11554	10034	5	89966	32
29	0 8	59 52	78428	8	21572	88472	13	11528	10044	5	89956	31
30	7 0 0	5 0 0	9.78445	8	10.21555	9.88498	13	10.11502	10.10053	5	9.89947	30
31	6 59 52	0 8	78461	9	21539	88524	14	11476	10063	5	89937	29
32	59 44	0 16	78478	9	21522	88550	14	11450	10073	5	89927	28
33	59 36	0 24	78494	9	21506	88577	14	11423	10082	5	89918	27
34	59 28	0 32	78510	9	21490	88603	15	11397	10092	5	89908	26
35	6 59 20	5 0 40	9.78527	10	10.21473	9.88629	15	10.11371	10.10102	6	9.89898	25
36	59 12	0 48	78543	10	21457	88655	16	11345	10112	6	89888	24
37	59 4	0 56	78560	10	21440	88681	16	11319	10121	6	89879	23
38	58 56	1 4	78576	10	21424	88707	17	11293	10131	6	89869	22
39	58 48	1 12	78592	11	21408	88733	17	11267	10141	6	89859	21
40	6 58 40	5 1 20	9.78609	11	10.21391	9.88759	17	10.11241	10.10151	6	9.89849	20
41	58 32	1 28	78625	11	21375	88786	18	11214	10160	7	89840	19
42	58 24	1 36	78642	12	21358	88812	18	11188	10170	7	89830	18
43	58 16	1 44	78658	12	21342	88838	19	11162	10180	7	89820	17
44	58 8	1 52	78674	12	21326	88864	19	11136	10190	7	89810	16
45	6 58 0	5 2 0	9.78691	12	10.21309	9.88890	20	10.11110	10.10199	7	9.89801	15
46	57 52	2 8	78707	13	21293	88916	20	11084	10209	7	89791	14
47	57 44	2 16	78723	13	21277	88942	20	11058	10219	8	89781	13
48	57 36	2 24	78739	13	21261	88968	21	11032	10229	8	89771	12
49	57 28	2 32	78756	13	21244	88994	21	11006	10239	8	89761	11
50	6 57 20	5 2 40	9.78772	14	10.21228	9.89020	22	10.10980	10.10248	8	9.89752	10
51	57 12	2 48	78788	14	21212	89046	22	10954	10258	8	89742	9
52	57 4	2 56	78805	14	21195	89073	23	10927	10268	8	89732	8
53	56 56	3 4	78821	15	21179	89099	23	10901	10278	9	89722	7
54	56 48	3 12	78837	15	21163	89125	24	10875	10288	9	89712	6
55	6 56 40	5 3 20	9.78853	15	10.21147	9.89151	24	10.10849	10.10298	9	9.89702	5
56	56 32	3 28	78869	15	21131	89177	24	10823	10307	9	89693	4
57	56 24	3 36	78886	16	21114	89203	25	10797	10317	9	89683	3
58	56 16	3 44	78902	16	21098	89229	25	10771	10327	9	89673	2
59	56 8	3 52	78918	16	21082	89255	26	10745	10337	10	89663	1
60	56 0	4 0	78934	16	21066	89281	26	10719	10347	10	89653	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
127°			A		A	B		B	C		C	52°

Seconds of time		1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols.	A	2	4	6	8	10	12	14
	B	3	7	10	13	16	20	23
	C	1	2	4	5	6	7	8

TABLE 44.

Log. Sines, Tangents, and Secants.

38°			A		A	B		B	C		C	141°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	6 56 0	5 4 0	9.78934	0	10.21066	9.89281	0	10.10719	10.10347	0	9.89653	60
1	55 52	4 8	78950	0	21050	89307	0	10693	10357	0	89643	59
2	55 44	4 16	78967	1	21033	89333	1	10667	10367	0	89633	58
3	55 36	4 24	78983	1	21017	89359	1	10641	10376	1	89624	57
4	55 28	4 32	78999	1	21001	89385	2	10615	10386	1	89614	56
5	6 55 20	5 4 40	9.79015	1	10.20985	9.89411	2	10.10589	10.10396	1	9.89604	55
6	55 12	4 48	79031	2	20969	89437	3	10563	10406	1	89594	54
7	55 4	4 56	79047	2	20953	89463	3	10537	10416	1	89584	53
8	54 56	5 4	79063	2	20937	89489	3	10511	10426	1	89574	52
9	54 48	5 12	79079	2	20921	89515	4	10485	10436	2	89564	51
10	6 54 40	5 5 20	9.79095	3	10.20905	9.89541	4	10.10459	10.10446	2	9.89554	50
11	54 32	5 28	79111	3	20889	89567	5	10433	10456	2	89544	49
12	54 24	5 36	79128	3	20872	89593	5	10407	10466	2	89534	48
13	54 16	5 44	79144	3	20856	89619	6	10381	10476	2	89524	47
14	54 8	5 52	79160	4	20840	89645	6	10355	10486	2	89514	46
15	6 54 0	5 6 0	9.79176	4	10.20824	9.89671	6	10.10329	10.10496	3	9.89504	45
16	53 52	6 8	79192	4	20808	89697	7	10303	10505	3	89495	44
17	53 44	6 16	79208	5	20792	89723	7	10277	10515	3	89485	43
18	53 36	6 24	79224	5	20776	89749	8	10251	10525	3	89475	42
19	53 28	6 32	79240	5	20760	89775	8	10225	10535	3	89465	41
20	6 53 20	5 6 40	9.79256	5	10.20744	9.89801	9	10.10199	10.10545	3	9.89455	40
21	53 12	6 48	79272	6	20728	89827	9	10173	10555	4	89445	39
22	53 4	6 56	79288	6	20712	89853	10	10147	10565	4	89435	38
23	52 56	7 4	79304	6	20696	89879	10	10121	10575	4	89425	37
24	52 48	7 12	79319	6	20681	89905	10	10095	10585	4	89415	36
25	6 52 40	5 7 20	9.79335	7	10.20665	9.89931	11	10.10069	10.10595	4	9.89405	35
26	52 32	7 28	79351	7	20649	89957	11	10043	10605	4	89395	34
27	52 24	7 36	79367	7	20633	89983	12	10017	10615	5	89385	33
28	52 16	7 44	79383	7	20617	90009	12	09991	10625	5	89375	32
29	52 8	7 52	79399	8	20601	90035	13	09965	10636	5	89364	31
30	6 52 0	5 8 0	9.79415	8	10.20585	9.90061	13	10.09939	10.10646	5	9.89354	30
31	51 52	8 8	79431	8	20569	90086	13	09914	10656	5	89344	29
32	51 44	8 16	79447	8	20553	90112	14	09888	10666	5	89334	28
33	51 36	8 24	79463	9	20537	90138	14	09862	10676	6	89324	27
34	51 28	8 32	79478	9	20522	90164	15	09836	10686	6	89314	26
35	6 51 20	5 8 40	9.79494	9	10.20506	9.90190	15	10.09810	10.10696	6	9.89304	25
36	51 12	8 48	79510	10	20490	90216	16	09784	10706	6	89294	24
37	51 4	8 56	79526	10	20474	90242	16	09758	10716	6	89284	23
38	50 56	9 4	79542	10	20458	90268	16	09732	10726	6	89274	22
39	50 48	9 12	79558	10	20442	90294	17	09706	10736	7	89264	21
40	6 50 40	5 9 20	9.79573	11	10.20427	9.90320	17	10.09680	10.10746	7	9.89254	20
41	50 32	9 28	79589	11	20411	90346	18	09654	10756	7	89244	19
42	50 24	9 36	79605	11	20395	90371	18	09629	10767	7	89233	18
43	50 16	9 44	79621	11	20379	90397	19	09603	10777	7	89223	17
44	50 8	9 52	79636	12	20364	90423	19	09577	10787	7	89213	16
45	6 50 0	5 10 0	9.79652	12	10.20348	9.90449	19	10.09551	10.10797	8	9.89203	15
46	49 52	10 8	79668	12	20332	90475	20	09525	10807	8	89193	14
47	49 44	10 16	79684	12	20316	90501	20	09499	10817	8	89183	13
48	49 36	10 24	79699	13	20301	90527	21	09473	10827	8	89173	12
49	49 28	10 32	79715	13	20285	90553	21	09447	10838	8	89162	11
50	6 49 20	5 10 40	9.79731	13	10.20269	9.90578	22	10.09422	10.10848	8	9.89152	10
51	49 12	10 48	79746	14	20254	90604	22	09396	10858	9	89142	9
52	49 4	10 56	79762	14	20238	90630	22	09370	10868	9	89132	8
53	48 56	11 4	79778	14	20222	90656	23	09344	10878	9	89122	7
54	48 48	11 12	79793	14	20207	90682	23	09318	10888	9	89112	6
55	6 48 40	5 11 20	9.79809	15	10.20191	9.90708	24	10.09292	10.10899	9	9.89101	5
56	48 32	11 28	79825	15	20175	90734	24	09266	10909	9	89091	4
57	48 24	11 36	79840	15	20160	90759	25	09241	10919	10	89081	3
58	48 16	11 44	79856	15	20144	90785	25	09215	10929	10	89071	2
59	48 8	11 52	79872	16	20128	90811	26	09189	10940	10	89060	1
60	48 0	12 0	79887	16	20113	90837	26	09163	10950	10	89050	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
128°			A		A	B		B	C		C	51°

Seconds of time		1ˢ	2ˢ	3ˢ	4ˢ	5ˢ	6ˢ	7ˢ
Prop. parts of cols.	A	2	4	6	8	10	12	14
	B	3	6	10	13	16	19	23
	C	1	3	4	5	6	8	9

TABLE 44.

Log. Sines, Tangents, and Secants.

39°			A		A	B		B	C		C	140°
M.	**Hour A. M.**	**Hour P. M.**	**Sine.**	**Diff.**	**Cosecant.**	**Tangent.**	**Diff.**	**Cotangent.**	**Secant.**	**Diff.**	**Cosine.**	**M.**
0	6 48 0	5 12 0	9. 79887	0	10. 20113	9. 90837	0	10. 09163	10. 10950	0	9. 89050	60
1	47 52	12 8	79903	0	20097	90863	0	09137	10960	0	89040	59
2	47 44	12 16	79918	1	20082	90889	1	09111	10970	0	89030	58
3	47 36	12 24	79934	1	20066	90914	1	09086	10980	1	89020	57
4	47 28	12 32	79950	1	20050	90940	2	09060	10991	1	89009	56
5	6 47 20	5 12 40	9. 79965	1	10. 20035	9. 90966	2	10. 09034	10. 11001	1	9. 88999	55
6	47 12	12 48	79981	2	20019	90992	3	09008	11011	1	88989	54
7	47 4	12 56	79996	2	20004	91018	3	08982	11022	1	88978	53
8	46 56	13 4	80012	2	19988	91043	3	08957	11032	1	88968	52
9	46 48	13 12	80027	2	19973	91069	4	08931	11042	2	88958	51
10	6 46 40	5 13 20	9. 80043	3	10. 19957	9. 91095	4	10. 08905	10. 11052	2	9. 88948	50
11	46 32	13 28	80058	3	19942	91121	5	08879	11063	2	88937	49
12	46 24	13 36	80074	3	19926	91147	5	08853	11073	2	88927	48
13	46 16	13 44	80089	3	19911	91172	6	08828	11083	2	88917	47
14	46 8	13 52	80105	4	19895	91198	6	08802	11094	2	88906	46
15	6 46 0	5 14 0	9. 80120	4	10. 19880	9. 91224	6	10. 08776	10. 11104	3	9. 88896	45
16	45 52	14 8	80136	4	19864	91250	7	08750	11114	3	88886	44
17	45 44	14 16	80151	4	19849	91276	7	08724	11125	3	88875	43
18	45 36	14 24	80166	5	19834	91301	8	08699	11135	3	88865	42
19	45 28	14 32	80182	5	19818	91327	8	08673	11145	3	88855	41
20	6 45 20	5 14 40	9. 80197	5	10. 19803	9. 91353	9	10. 08647	10. 11156	3	9. 88844	40
21	45 12	14 48	80213	5	19787	91379	9	08621	11166	4	88834	39
22	45 4	14 56	80228	6	19772	91404	9	08596	11176	4	88824	38
23	44 56	15 4	80244	6	19756	91430	10	08570	11187	4	88813	37
24	44 48	15 12	80259	6	19741	91456	10	08544	11197	4	88803	36
25	6 44 40	5 15 20	9. 80274	6	10. 19726	9. 91482	11	10. 08518	10. 11207	4	9. 88793	35
26	44 32	15 28	80290	7	19710	91507	11	08493	11218	5	88782	34
27	44 24	15 36	80305	7	19695	91533	12	08467	11228	5	88772	33
28	44 16	15 44	80320	7	19680	91559	12	08441	11239	5	88761	32
29	44 8	15 52	80336	7	19664	91585	12	08415	11249	5	88751	31
30	6 44 0	5 16 0	9. 80351	8	10. 19649	9. 91610	13	10. 08390	10. 11259	5	9. 88741	30
31	43 52	16 8	80366	8	19634	91636	13	08364	11270	5	88730	29
32	43 44	16 16	80382	8	19618	91662	14	08338	11280	6	88720	28
33	43 36	16 24	80397	8	19603	91688	14	08312	11291	6	88709	27
34	43 28	16 32	80412	9	19588	91713	15	08287	11301	6	88699	26
35	6 43 20	5 16 40	9. 80428	9	10. 19572	9. 91739	15	10. 08261	10. 11312	6	9. 88688	25
36	43 12	16 48	80443	9	19557	91765	15	08235	11322	6	88678	24
37	43 4	16 56	80458	9	19542	91791	16	08209	11332	6	88668	23
38	42 56	17 4	80473	10	19527	91816	16	08184	11343	7	88657	22
39	42 48	17 12	80489	10	19511	91842	17	08158	11353	7	88647	21
40	6 42 40	5 17 20	9. 80504	10	10. 19496	9. 91868	17	10. 08132	10. 11364	7	9. 88636	20
41	42 32	17 28	80519	10	19481	91893	18	08107	11374	7	88626	19
42	42 24	17 36	80534	11	19466	91919	18	08081	11385	7	88615	18
43	42 16	17 44	80550	11	19450	91945	18	08055	11395	7	88605	17
44	42 8	17 52	80565	11	19435	91971	19	08029	11406	8	88594	16
45	6 42 0	5 18 0	9. 80580	12	10. 19420	9. 91996	19	10. 08004	10. 11416	8	9. 88584	15
46	41 52	18 8	80595	12	19405	92022	20	07978	11427	8	88573	14
47	41 44	18 16	80610	12	19390	92048	20	07952	11437	8	88563	13
48	41 36	18 24	80625	12	19375	92073	21	07927	11448	8	88552	12
49	41 28	18 32	80641	13	19359	92099	21	07901	11458	9	88542	11
50	6 41 20	5 18 40	9. 80656	13	10. 19344	9. 92125	21	10. 07875	10. 11469	9	9. 88531	10
51	41 12	18 48	80671	13	19329	92150	22	07850	11479	9	88521	9
52	41 4	18 56	80686	13	19314	92176	22	07824	11490	9	88510	8
53	40 56	19 4	80701	14	19299	92202	23	07798	11501	9	88499	7
54	40 48	19 12	80716	14	19284	92227	23	07773	11511	9	88489	6
55	6 40 40	5 19 20	9. 80731	14	10. 19269	9. 92253	24	10. 07747	10. 11522	10	9. 88478	5
56	40 32	19 28	80746	14	19254	92279	24	07721	11532	10	88468	4
57	40 24	19 36	80762	15	19238	92304	24	07696	11543	10	88457	3
58	40 16	19 44	80777	15	19223	92330	25	07670	11553	10	88447	2
59	40 8	19 52	80792	15	19208	92356	25	07644	11564	10	88436	1
60	40 0	20 0	80807	15	19193	92381	26	07619	11575	10	88425	0
M.	**Hour P. M.**	**Hour A. M.**	**Cosine.**	**Diff.**	**Secant.**	**Cotangent.**	**Diff.**	**Tangent.**	**Cosecant.**	**Diff.**	**Sine.**	**M.**
129°			A		A	B		B.	C		C	50°

Seconds of time		1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols.	A	2	4	6	8	10	12	13
	B	3	6	10	13	16	19	23
	C	1	3	4	5	7	8	9

TABLE 44.

Log. Sines, Tangents, and Secants.

40°			A		A	B		B	C		C	139°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	6 40 0	5 20 0	9. 80807	0	10. 19193	9. 92381	0	10. 07619	10. 11575	0	9. 88425	60
1	39 52	20 8	80822	0	19178	92407	0	07593	11585	0	88415	59
2	39 44	20 16	80837	0	19163	92433	1	07567	11596	0	88404	58
3	39 36	20 24	80852	1	19148	92458	1	07542	11606	1	88394	57
4	39 28	20 32	80867	1	19133	92484	2	07516	11617	1	88383	56
5	6 39 20	5 20 40	9. 80882	1	10. 19118	9. 92510	2	10. 07490	10. 11628	1	9. 88372	55
6	39 12	20 48	80897	1	19103	92535	3	07465	11638	1	88362	54
7	39 4	20 56	80912	2	19088	92561	3	07439	11649	1	88351	53
8	38 56	21 4	80927	2	19073	92587	3	07413	11660	1	88340	52
9	38 48	21 12	80942	2	19058	92612	4	07388	11670	2	88330	51
10	6 38 40	5 21 20	9. 80957	2	10. 19043	9. 92638	4	10. 07362	10. 11681	2	9. 88319	50
11	38 32	21 28	80972	3	19028	92663	5	07337	11692	2	88308	49
12	38 24	21 36	80987	3	19013	92689	5	07311	11702	2	88298	48
13	38 16	21 44	81002	3	18998	92715	6	07285	11713	2	88287	47
14	38 8	21 52	81017	3	18983	92740	6	07260	11724	3	88276	46
15	6 38 0	5 22 0	9. 81032	4	10. 18968	9. 92766	6	10. 07234	10. 11734	3	9. 88266	45
16	37 52	22 8	81047	4	18953	92792	7	07208	11745	3	88255	44
17	37 44	22 16	81061	4	18939	92817	7	07183	11756	3	88244	43
18	37 36	22 24	81076	4	18924	92843	8	07157	11766	3	88234	42
19	37 28	22 32	81091	5	18909	92868	8	07132	11777	3	88223	41
20	6 37 20	5 22 40	9. 81106	5	10. 18894	9. 92894	9	10. 07106	10. 11788	4	9. 88212	40
21	37 12	22 48	81121	5	18879	92920	9	07080	11799	4	88201	39
22	37 4	22 56	81136	5	18864	92945	9	07055	11809	4	88191	38
23	36 56	23 4	81151	6	18849	92971	10	07029	11820	4	88180	37
24	36 48	23 12	81166	6	18834	92996	10	07004	11831	4	88169	36
25	6 36 40	5 23 20	9. 81180	6	10. 18820	9. 93022	11	10. 06978	10. 11842	4	9. 88158	35
26	36 32	23 28	81195	6	18805	93048	11	06952	11852	5	88148	34
27	36 24	23 36	81210	7	18790	93073	12	06927	11863	5	88137	33
28	36 16	23 44	81225	7	18775	93099	12	06901	11874	5	88126	32
29	36 8	23 52	81240	7	18760	93124	12	06876	11885	5	88115	31
30	6 36 0	5 24 0	9. 81254	7	10. 18746	9. 93150	13	10. 06850	10. 11895	5	9. 88105	30
31	35 52	24 8	81269	8	18731	93175	13	06825	11906	6	88094	29
32	35 44	24 16	81284	8	18716	93201	14	06799	11917	6	88083	28
33	35 36	24 24	81299	8	18701	93227	14	06773	11928	6	88072	27
34	35 28	24 32	81314	8	18686	93252	14	06748	11939	6	88061	26
35	6 35 20	5 24 40	9. 81328	9	10. 18672	9. 93278	15	10. 06722	10. 11949	6	9 88051	25
36	35 12	24 48	81343	9	18657	93303	15	06697	11960	6	88040	24
37	35 4	24 56	81358	9	18642	93329	16	06671	11971	7	88029	23
38	34 56	25 4	81372	9	18628	93354	16	06646	11982	7	88018	22
39	34 48	25 12	81387	10	18613	93380	17	06620	11993	7	88007	21
40	6 34 40	5 25 20	9. 81402	10	10. 18598	9. 93406	17	10. 06594	10. 12004	7	9. 87996	20
41	34 32	25 28	81417	10	18583	93431	17	06569	12015	7	87985	19
42	34 24	25 36	81431	10	18569	93457	18	06543	12025	8	87975	18
43	34 16	25 44	81446	11	18554	93482	18	06518	12036	8	87964	17
44	34 8	25 52	81461	11	18539	93508	19	06492	12047	8	87953	16
45	6 34 0	5 26 0	9. 81475	11	10. 18525	9. 93533	19	10. 06467	10. 12058	8	9. 87942	15
46	33 52	26 8	81490	11	18510	93559	20	06441	12069	8	87931	14
47	33 44	26 16	81505	12	18495	93584	20	06416	12080	8	87920	13
48	33 36	26 24	81519	12	18481	93610	20	06390	12091	9	87909	12
49	33 28	26 32	81534	12	18466	93636	21	06364	12102	9	87898	11
50	6 33 20	5 26 40	9. 81549	12	10. 18451	9. 93661	21	10. 06339	10. 12113	9	9. 87887	10
51	33 12	26 48	81563	13	18437	93687	22	06313	12123	9	87877	9
52	33 4	26 56	81578	13	18422	93712	22	06288	12134	9	87866	8
53	32 56	27 4	81592	13	18408	93738	23	06262	12145	10	87855	7
54	32 48	27 12	81607	13	18393	93763	23	06237	12156	10	87844	6
55	6 32 40	5 27 20	9. 81622	14	10. 18378	9. 93789	23	10. 06211	10. 12167	10	9. 87833	5
56	32 32	27 28	81636	14	18364	93814	24	06186	12178	10	87822	4
57	32 24	27 36	81651	14	18349	93840	24	06160	12189	10	87811	3
58	32 16	27 44	81665	14	18335	93865	25	06135	12200	10	87800	2
59	32 8	27 52	81680	15	18320	93891	25	06109	12211	11	87789	1
60	32 0	28 0	81694	15	18306	93916	26	06084	12222	11	87778	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
130°			A		A	B		B	C		C	49°

Seconds of time	1^s	2^s	3^s	4^s	5^s	6^s	7^s
Prop. parts of cols. A	2	4	6	7	9	11	13
Prop. parts of cols. B	3	6	10	13	16	19	22
Prop. parts of cols. C	1	3	4	5	7	8	9

TABLE 44.

Log. Sines, Tangents, and Secants.

41°			A		A	B		B	C		C	138°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	6 32 0	5 28 0	9. 81694	0	10. 18306	9. 93916	0	10. 06084	10. 12222	0	9. 87778	60
1	31 52	28 8	81709	0	18291	93942	0	06058	12233	0	87767	59
2	31 44	28 16	81723	0	18277	93967	1	06033	12244	0	87756	58
3	31 36	28 24	81738	1	18262	93993	1	06007	12255	1	87745	57
4	31 28	28 32	81752	1	18248	94018	2	05982	12266	1	87734	56
5	6 31 20	5 28 40	9. 81767	1	10. 18233	9. 94044	2	10. 05956	10. 12277	1	9. 87723	55
6	31 12	28 48	81781	1	18219	94069	3	05931	12288	1	87712	54
7	31 4	28 56	81796	2	18204	94095	3	05905	12299	1	87701	53
8	30 56	29 4	81810	2	18190	94120	3	05880	12310	1	87690	52
9	30 48	29 12	81825	2	18175	94146	4	05854	12321	2	87679	51
10	6 30 40	5 29 20	9. 81839	2	10. 18161	9. 94171	4	10. 05829	10. 12332	2	9. 87668	50
11	30 32	29 28	81854	3	18146	94197	5	05803	12343	2	87657	49
12	30 24	29 36	81868	3	18132	94222	5	05778	12354	2	87646	48
13	30 16	29 44	81882	3	18118	94248	6	05752	12365	2	87635	47
14	30 8	29 52	81897	3	18103	94273	6	05727	12376	3	87624	46
15	6 30 0	5 30 0	9. 81911	4	10. 18089	9. 94299	6	10. 05701	10. 12387	3	9. 87613	45
16	29 52	30 8	81926	4	18074	94324	7	05676	12399	3	87601	44
17	29 44	30 16	81940	4	18060	94350	7	05650	12410	3	87590	43
18	29 36	30 24	81955	4	18045	94375	8	05625	12421	3	87579	42
19	29 28	30 32	81969	5	18031	94401	8	05599	12432	4	87568	41
20	6 29 20	5 30 40	9. 81983	5	10. 18017	9. 94426	8	10. 05574	10. 12443	4	9. 87557	40
21	29 12	30 48	81998	5	18002	94452	9	05548	12454	4	87546	39
22	29 4	30 56	82012	5	17988	94477	9	05523	12465	4	87535	38
23	28 56	31 4	82026	5	17974	94503	10	05497	12476	4	87524	37
24	28 48	31 12	82041	6	17959	94528	10	05472	12487	4	87513	36
25	6 28 40	5 31 20	9. 82055	6	10. 17945	9. 94554	11	10. 05446	10. 12499	5	9. 87501	35
26	28 32	31 28	82069	6	17931	94579	11	05421	12510	5	87490	34
27	28 24	31 36	82084	6	17916	94604	11	05396	12521	5	87479	33
28	28 16	31 44	82098	7	17902	94630	12	05370	12532	5	87468	32
29	28 8	31 52	82112	7	17888	94655	12	05345	12543	5	87457	31
30	6 28 0	5 32 0	9. 82126	7	10. 17874	9. 94681	13	10. 05319	10. 12554	6	9. 87446	30
31	27 52	32 8	82141	7	17859	94706	13	05294	12566	6	87434	29
32	27 44	32 16	82155	8	17845	94732	14	05268	12577	6	87423	28
33	27 36	32 24	82169	8	17831	94757	14	05243	12588	6	87412	27
34	27 28	32 32	82184	8	17816	94783	14	05217	12599	6	87401	26
35	6 27 20	5 32 40	9. 82198	8	10. 17802	9. 94808	15	10. 05192	10. 12610	7	9. 87390	25
36	27 12	32 48	82212	9	17788	94834	15	05166	12622	7	87378	24
37	27 4	32 56	82226	9	17774	94859	16	05141	12633	7	87367	23
38	26 56	33 4	82240	9	17760	94884	16	05116	12644	7	87356	22
39	26 48	33 12	82255	9	17745	94910	17	05090	12655	7	87345	21
40	6 26 40	5 33 20	9. 82269	10	10. 17731	9. 94935	17	10. 05065	10. 12666	7	9. 87334	20
41	26 32	33 28	82283	10	17717	94961	17	05039	12678	8	87322	19
42	26 24	33 36	82297	10	17703	94986	18	05014	12689	8	87311	18
43	26 16	33 44	82311	10	17689	95012	18	04988	12700	8	87300	17
44	26 8	33 52	82326	10	17674	95037	19	04963	12712	8	87288	16
45	6 26 0	5 34 0	9. 82340	11	10. 17660	9. 95062	19	10. 04938	10. 12723	8	9. 87277	15
46	25 52	34 8	82354	11	17646	95088	20	04912	12734	9	87266	14
47	25 44	34 16	82368	11	17632	95113	20	04887	12745	9	87255	13
48	25 36	34 24	82382	11	17618	95139	20	04861	12757	9	87243	12
49	25 28	34 32	82396	12	17604	95164	21	04836	12768	9	87232	11
50	6 25 20	5 34 40	9. 82410	12	10. 17590	9. 95190	21	10. 04810	10. 12779	9	9. 87221	10
51	25 12	34 48	82424	12	17576	95215	22	04785	12791	10	87209	9
52	25 4	34 56	82439	12	17561	95240	22	04760	12802	10	87198	8
53	24 56	35 4	82453	13	17547	95266	22	04734	12813	10	87187	7
54	24 48	35 12	82467	13	17533	95291	23	04709	12825	10	87175	6
55	6 24 40	5 35 20	9. 82481	13	10. 17519	9. 95317	23	10. 04683	10. 12836	10	9. 87164	5
56	24 32	35 28	82495	13	17505	95342	24	04658	12847	10	87153	4
57	24 24	35 36	82509	14	17491	95368	24	04632	12859	11	87141	3
58	24 16	35 44	82523	14	17477	95393	25	04607	12870	11	87130	2
59	24 8	35 52	82537	14	17463	95418	25	04582	12881	11	87119	1
60	24 0	36 0	82551	14	17449	95444	25	04556	12893	11	87107	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
131°			A		A	B		B	C		C	48°

Seconds of time		1ˢ	2ˢ	3ˢ	4ˢ	5ˢ	6ˢ	7ˢ
Prop. parts of cols.	A	2	4	5	7	9	11	12
	B	3	6	10	13	16	19	22
	C	2	3	4	6	7	8	10

TABLE 44.

Log. Sines, Tangents, and Secants.

42°			A		A	B		B	C		C	137°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	6 24 0	5 36 0	9. 82551	0	10. 17449	9. 95444	0	10. 04556	10. 12893	0	9. 87107	60
1	23 52	36 8	82565	0	17435	95469	0	04531	12904	0	87096	59
2	23 44	36 16	82579	0	17421	95495	1	04505	12915	0	87085	58
3	23 36	36 24	82593	1	17407	95520	1	04480	12927	1	87073	57
4	23 28	36 32	82607	1	17393	95545	2	04455	12938	1	87062	56
5	6 23 20	5 36 40	9. 82621	1	10. 17379	9. 95571	2	10. 04429	10. 12950	1	9. 87050	55
6	23 12	36 48	82635	1	17365	95596	3	04404	12961	1	87039	54
7	23 4	36 56	82649	2	17351	95622	3	04378	12972	1	87028	53
8	22 56	37 4	82663	2	17337	95647	3	04353	12984	2	87016	52
9	22 48	37 12	82677	2	17323	95672	4	04328	12995	2	87005	51
10	6 22 40	5 37 20	9. 82691	2	10. 17309	9. 95698	4	10. 04302	10. 13007	2	9. 86993	50
11	22 32	37 28	82705	3	17295	95723	5	04277	13018	2	86982	49
12	22 24	37 36	82719	3	17281	95748	5	04252	13030	2	86970	48
13	22 16	37 44	82733	3	17267	95774	5	04226	13041	3	86959	47
14	22 8	37 52	82747	3	17253	95799	6	04201	13053	3	86947	46
15	6 22 0	5 38 0	9. 82761	3	10. 17239	9. 95825	6	10. 04175	10. 13064	3	9. 86936	45
16	21 52	38 8	82775	4	17225	95850	7	04150	13076	3	86924	44
17	21 44	38 16	82788	4	17212	95875	7	04125	13087	3	86913	43
18	21 36	38 24	82802	4	17198	95901	8	04099	13098	3	86902	42
19	21 28	38 32	82816	4	17184	95926	8	04074	13110	4	86890	41
20	6 21 20	5 38 40	9. 82830	5	10. 17170	9. 95952	8	10. 04048	10. 13121	4	9. 86879	40
21	21 12	38 48	82844	5	17156	95977	9	04023	13133	4	86867	39
22	21 4	38 56	82858	5	17142	96002	9	03998	13145	4	86855	38
23	20 56	39 4	82872	5	17128	96028	10	03972	13156	4	86844	37
24	20 48	39 12	82885	6	17115	96053	10	03947	13168	5	86832	36
25	6 20 40	5 39 20	9. 82899	6	10. 17101	9. 96078	11	10. 03922	10. 13179	5	9. 86821	35
26	20 32	39 28	82913	6	17087	96104	11	03896	13191	5	86809	34
27	20 24	39 36	82927	6	17073	96129	11	03871	13202	5	86798	33
28	20 16	39 44	82941	6	17059	96155	12	03845	13214	5	86786	32
29	20 8	39 52	82955	7	17045	96180	12	03820	13225	6	86775	31
30	6 20 0	5 40 0	9. 82968	7	10. 17032	9. 96205	13	10. 03795	10. 13237	6	9. 86763	30
31	19 52	40 8	82982	7	17018	96231	13	03769	13248	6	86752	29
32	19 44	40 16	82996	7	17004	96256	14	03744	13260	6	86740	28
33	19 36	40 24	83010	8	16990	96281	14	03719	13272	6	86728	27
34	19 28	40 32	83023	8	16977	96307	14	03693	13283	7	86717	26
35	6 19 20	5 40 40	9. 83037	8	10. 16963	9. 96332	15	10. 03668	10. 13295	7	9. 86705	25
36	19 12	40 48	83051	8	16949	96357	15	03643	13306	7	86694	24
37	19 4	40 56	83065	8	16935	96383	16	03617	13318	7	86682	23
38	18 56	41 4	83078	9	16922	96408	16	03592	13330	7	86670	22
39	18 48	41 12	83092	9	16908	96433	16	03567	13341	8	86659	21
40	6 18 40	5 41 20	9. 83106	9	10. 16894	9. 96459	17	10. 03541	10. 13353	8	9. 86647	20
41	18 32	41 28	83120	9	16880	96484	17	03516	13365	8	86635	19
42	18 24	41 36	83133	10	16867	96510	18	03490	13376	8	86624	18
43	18 16	41 44	83147	10	16853	96535	18	03465	13388	8	86612	17
44	18 8	41 52	83161	10	16839	96560	19	03440	13400	8	86600	16
45	6 18 0	5 42 0	9. 83174	10	10. 16826	9. 96586	19	10. 03414	10. 13411	9	9. 86589	15
46	17 52	42 8	83188	11	16812	96611	19	03389	13423	9	86577	14
47	17 44	42 16	83202	11	16798	96636	20	03364	13435	9	86565	13
48	17 36	42 24	83215	11	16785	96662	20	03338	13446	9	86554	12
49	17 28	42 32	83229	11	16771	96687	21	03313	13458	9	86542	11
50	6 17 20	5 42 40	9. 83242	11	10. 16758	9. 96712	21	10. 03288	10. 13470	10	9. 86530	10
51	17 12	42 48	83256	12	16744	96738	22	03262	13482	10	86518	9
52	17 4	42 56	83270	12	16730	96763	22	03237	13493	10	86507	8
53	16 56	43 4	83283	12	16717	96788	22	03212	13505	10	86495	7
54	16 48	43 12	83297	12	16703	96814	23	03186	13517	10	86483	6
55	6 16 40	5 43 20	9. 83310	13	10. 16690	9. 96839	23	10. 03161	10. 13528	11	9. 86472	5
56	16 32	43 28	83324	13	16676	96864	24	03136	13540	11	86460	4
57	16 24	43 36	83338	13	16662	96890	24	03110	13552	11	86448	3
58	16 16	43 44	83351	13	16649	96915	25	03085	13564	11	86436	2
59	16 8	43 52	83365	14	16635	96940	25	03060	13575	11	86425	1
60	16 0	44 0	83378	14	16622	96966	25	03034	13587	12	86413	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
132°			A		A	B		B	C		C	47°

Seconds of time		1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols.	A	2	3	5	7	9	10	12
	B	3	6	10	13	16	19	22
	C	1	3	4	6	7	9	10

TABLE 44.

Log. Sines, Tangents, and Secants.

43°			A		A	B		B	C		C	136°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	6 16 0	5 44 0	9. 83378	0	10. 16622	9. 96966	0	10. 03034	10. 13587	0	9. 86413	60
1	15 52	44 8	83392	0	16608	96991	0	03009	13599	0	86401	59
2	15 44	44 16	83405	0	16595	97016	1	02984	13611	0	86389	58
3	15 36	44 24	83419	1	16581	97042	1	02958	13623	1	86377	57
4	15 28	44 32	83432	1	16568	97067	2	02933	13634	1	86366	56
5	6 15 20	5 44 40	9. 83446	1	10. 16554	9. 97092	2	10. 02908	10. 13646	1	9. 86354	55
6	15 12	44 48	83459	1	16541	97118	3	02882	13658	1	86342	54
7	15 4	44 56	83473	2	16527	97143	3	02857	13670	1	86330	53
8	14 56	45 4	83486	2	16514	97168	3	02832	13682	2	86318	52
9	14 48	45 12	83500	2	16500	97193	4	02807	13694	2	86306	51
10	6 14 40	5 45 20	9. 83513	2	10. 16487	9. 97219	4	10. 02781	10. 13705	2	9. 86295	50
11	14 32	45 28	83527	2	16473	97244	5	02756	13717	2	86283	49
12	14 24	45 36	83540	3	16460	97269	5	02731	13729	2	86271	48
13	14 16	45 44	83554	3	16446	97295	5	02705	13741	3	86259	47
14	14 8	45 52	83567	3	16433	97320	6	02680	13753	3	86247	46
15	6 14 0	5 46 0	9. 83581	3	10. 16419	9. 97345	6	10. 02655	10. 13765	3	9. 86235	45
16	13 52	46 8	83594	4	16406	97371	7	02629	13777	3	86223	44
17	13 44	46 16	83608	4	16392	97396	7	02604	13789	3	86211	43
18	13 36	46 24	83621	4	16379	97421	8	02579	13800	4	86200	42
19	13 28	46 32	83634	4	16366	97447	8	02553	13812	4	86188	41
20	6 13 20	5 46 40	9. 83648	4	10. 16352	9. 97472	8	10. 02528	10. 13824	4	9. 86176	40
21	13 12	46 48	83661	5	16339	97497	9	02503	13836	4	86164	39
22	13 4	46 56	83674	5	16326	97523	9	02477	13848	4	86152	38
23	12 56	47 4	83688	5	16312	97548	10	02452	13860	5	86140	37
24	12 48	47 12	83701	5	16299	97573	10	02427	13872	5	86128	36
25	6 12 40	5 47 20	9. 83715	6	10. 16285	9. 97598	11	10. 02402	10. 13884	5	9. 86116	35
26	12 32	47 28	83728	6	16272	97624	11	02376	13896	5	86104	34
27	12 24	47 36	83741	6	16259	97649	11	02351	13908	5	86092	33
28	12 16	47 44	83755	6	16245	97674	12	02326	13920	6	86080	32
29	12 8	47 52	83768	6	16232	97700	12	02300	13932	6	86068	31
30	6 12 0	5 48 0	9. 83781	7	10. 16219	9. 97725	13	10. 02275	10. 13944	6	9. 86056	30
31	11 52	48 8	83795	7	16205	97750	13	02250	13956	6	86044	29
32	11 44	48 16	83808	7	16192	97776	13	02224	13968	6	86032	28
33	11 36	48 24	83821	7	16179	97801	14	02199	13980	7	86020	27
34	11 28	48 32	83834	8	16166	97826	14	02174	13992	7	86008	26
35	6 11 20	5 48 40	9. 83848	8	10. 16152	9. 97851	15	10. 02149	10. 14004	7	9. 85996	25
36	11 12	48 48	83861	8	16139	97877	15	02123	14016	7	85984	24
37	11 4	48 56	83874	8	16126	97902	16	02098	14028	7	85972	23
38	10 56	49 4	83887	8	16113	97927	16	02073	14040	8	85960	22
39	10 48	49 12	83901	9	16099	97953	16	02047	14052	8	85948	21
40	6 10 40	5 49 20	9. 83914	9	10. 16086	9. 97978	17	10. 02022	10. 14064	8	9. 85936	20
41	10 32	49 28	83927	9	16073	98003	17	01997	14076	8	85924	19
42	10 24	49 36	83940	9	16060	98029	18	01971	14088	8	85912	18
43	10 16	49 44	83954	10	16046	98054	18	01946	14100	9	85900	17
44	10 8	49 52	83967	10	16033	98079	19	01921	14112	9	85888	16
45	6 10 0	5 50 0	9. 83980	10	10. 16020	9. 98104	19	10. 01896	10. 14124	9	9. 85876	15
46	9 52	50 8	83993	10	16007	98130	19	01870	14136	9	85864	14
47	9 44	50 16	84006	10	15994	98155	20	01845	14149	9	85851	13
48	9 36	50 24	84020	11	15980	98180	20	01820	14161	10	85839	12
49	9 28	50 32	84033	11	15967	98206	21	01794	14173	10	85827	11
50	6 9 20	5 50 40	9. 84046	11	10. 15954	9. 98231	21	10. 01769	10. 14185	10	9. 85815	10
51	9 12	50 48	84059	11	15941	98256	22	01744	14197	10	85803	9
52	9 4	50 56	84072	12	15928	98281	22	01719	14209	10	85791	8
53	8 56	51 4	84085	12	15915	98307	22	01693	14221	11	85779	7
54	8 48	51 12	84098	12	15902	98332	23	01668	14234	11	85766	6
55	6 8 40	5 51 20	9. 84112	12	10. 15888	9. 98357	23	10. 01643	10. 14246	11	9. 85754	5
56	8 32	51 28	84125	12	15875	98383	24	01617	14258	11	85742	4
57	8 24	51 36	84138	13	15862	98408	24	01592	14270	11	85730	3
58	8 16	51 44	84151	13	15849	98433	24	01567	14282	12	85718	2
59	8 8	51 52	84164	13	15836	98458	25	01542	14294	12	85706	1
60	8 0	52 0	84177	13	15823	98484	25	01516	14307	12	85693	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
133°			A		A	B		B	C		C	46°

Seconds of time........		1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols.	A	2	3	5	7	8	10	12
	B	3	6	9	13	16	19	22
	C	2	3	5	6	8	9	11

TABLE 44.

Log. Sines, Tangents, and Secants.

44°			A		A	B		B	C		C	185°
M.	Hour A. M.	Hour P. M.	Sine.	Diff.	Cosecant.	Tangent.	Diff.	Cotangent.	Secant.	Diff.	Cosine.	M.
0	6 8 0	5 52 0	9. 84177	0	10. 15823	9. 98484	0	10. 01516	10. 14307	0	9. 85693	60
1	7 52	52 8	84190	0	15810	98509	0	01491	14319	0	85681	59
2	7 44	52 16	84203	0	15797	98534	1	01466	14331	0	85669	58
3	7 36	52 24	84216	1	15784	98560	1	01440	14343	1	85657	57
4	7 28	52 32	84229	1	15771	98585	2	01415	14355	1	85645	56
5	6 7 20	5 52 40	9. 84242	1	10. 15758	9. 98610	2	10. 01390	10. 14368	1	9. 85632	55
6	7 12	52 48	84255	1	15745	98635	3	01365	14380	1	85620	54
7	7 4	52 56	84269	2	15731	98661	3	01339	14392	1	85608	53
8	6 56	53 4	84282	2	15718	98686	3	01314	14404	2	85596	52
9	6 48	53 12	84295	2	15705	98711	4	01289	14417	2	85583	51
10	6 6 40	5 53 20	9. 84308	2	10. 15692	9. 98737	4	10. 01263	10. 14429	2	9. 85571	50
11	6 32	53 28	84321	2	15679	98762	5	01238	14441	2	85559	49
12	6 24	53 36	84334	3	15666	98787	5	01213	14453	2	85547	48
13	6 16	53 44	84347	3	15653	98812	5	01188	14466	3	85534	47
14	6 8	53 52	84360	3	15640	98838	6	01162	14478	3	85522	46
15	6 6 0	5 54 0	9. 84373	3	10. 15627	9. 98863	6	10. 01137	10. 14490	3	9. 85510	45
16	5 52	54 8	84385	3	15615	98888	7	01112	14503	3	85497	44
17	5 44	54 16	84398	4	15602	98913	7	01087	14515	4	85485	43
18	5 36	54 24	84411	4	15589	98939	8	01061	14527	4	85473	42
19	5 28	54 32	84424	4	15576	98964	8	01036	14540	4	85460	41
20	6 5 20	5 54 40	9. 84437	4	10. 15563	9. 98989	8	10. 01011	10. 14552	4	9. 85448	40
21	5 12	54 48	84450	5	15550	99015	9	00985	14564	4	85436	39
22	5 4	54 56	84463	5	15537	99040	9	00960	14577	5	85423	38
23	4 56	55 4	84476	5	15524	99065	10	00935	14589	5	85411	37
24	4 48	55 12	84489	5	15511	99090	10	00910	14601	5	85399	36
25	6 4 40	5 55 20	9. 84502	5	10. 15498	9. 99116	11	10. 00884	10. 14614	5	9. 85386	35
26	4 32	55 28	84515	6	15485	99141	11	00859	14626	5	85374	34
27	4 24	55 36	84528	6	15472	99166	11	00834	14639	6	85361	33
28	4 16	55 44	84540	6	15460	99191	12	00809	14651	6	85349	32
29	4 8	55 52	84553	6	15447	99217	12	00783	14663	6	85337	31
30	6 4 0	5 56 0	9. 84566	6	10. 15434	9. 99242	13	10. 00758	10. 14676	6	9. 85324	30
31	3 52	56 8	84579	7	15421	99267	13	00733	14688	6	85312	29
32	3 44	56 16	84592	7	15408	99293	13	00707	14701	7	85299	28
33	3 36	56 24	84605	7	15395	99318	14	00682	14713	7	85287	27
34	3 28	56 32	84618	7	15382	99343	14	00657	14726	7	85274	26
35	6 3 20	5 56 40	9. 84630	8	10. 15370	9. 99368	15	10. 00632	10. 14738	7	9. 85262	25
36	3 12	56 48	84643	8	15357	99394	15	00606	14750	7	85250	24
37	3 4	56 56	84656	8	15344	99419	16	00581	14763	8	85237	23
38	2 56	57 4	84669	8	15331	99444	16	00556	14775	8	85225	22
39	2 48	57 12	84682	8	15318	99469	16	00531	14788	8	85212	21
40	6 2 40	5 57 20	9. 84694	9	10. 15306	9. 99495	17	10. 00505	10. 14800	8	9. 85200	20
41	2 32	57 28	84707	9	15293	99520	17	00480	14813	8	85187	19
42	2 24	57 36	84720	9	15280	99545	18	00455	14825	9	85175	18
43	2 16	57 44	84733	9	15267	99570	18	00430	14838	9	85162	17
44	2 8	57 52	84745	9	15255	99596	19	00404	14850	9	85150	16
45	6 2 0	5 58 0	9. 84758	10	10. 15242	9. 99621	19	10. 00379	10. 14863	9	9. 85137	15
46	1 52	58 8	84771	10	15229	99646	19	00354	14875	10	85125	14
47	1 44	58 16	84784	10	15216	99672	20	00328	14888	10	85112	13
48	1 36	58 24	84796	10	15204	99697	20	00303	14900	10	85100	12
49	1 28	58 32	84809	11	15191	99722	21	00278	14913	10	85087	11
50	6 1 20	5 58 40	9. 84822	11	10. 15178	9. 99747	21	10. 00253	10. 14926	10	9. 85074	10
51	1 12	58 48	84835	11	15165	99773	21	00227	14938	11	85062	9
52	1 4	58 56	84847	11	15153	99798	22	00202	14951	11	85049	8
53	0 56	59 4	84860	11	15140	99823	22	00177	14963	11	85037	7
54	0 48	59 12	84873	12	15127	99848	23	00152	14976	11	85024	6
55	6 0 40	5 59 20	9. 84885	12	10. 15115	9. 99874	23	10. 00126	10. 14988	11	9. 85012	5
56	0 32	59 28	84898	12	15102	99899	24	00101	15001	12	84999	4
57	0 24	59 36	84911	12	15089	99924	24	00076	15014	12	84986	3
58	0 16	59 44	84923	12	15077	99949	24	00051	15026	12	84974	2
59	0 8	59 52	84936	13	15064	99975	25	00025	15039	12	84961	1
60	0 0	6 0 0	84949	13	15051	10. 00000	25	00000	15051	12	84949	0
M.	Hour P. M.	Hour A. M.	Cosine.	Diff.	Secant.	Cotangent.	Diff.	Tangent.	Cosecant.	Diff.	Sine.	M.
134°			A		A	B		B	C		C	45°

Seconds of time	1s	2s	3s	4s	5s	6s	7s
Prop. parts of cols. A	2	3	5	6	8	10	11
B	3	6	9	13	16	19	22
C	2	3	5	6	8	9	11

TABLE 45.

Haversines.

s ′	$0^h\ 0^m$ 0° 0′		$0^h\ 2^m$ 0° 30′		$0^h\ 4^m$ 1° 0′		$0^h\ 6^m$ 1° 30′		$0^h\ 8^m$ 2° 0′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0 · 0	—00	0.00000	5.27963	0.00002	5.88168	0.00008	6.23385	0.00017	6.48371	0.00030	60
2	1.72333	.00000	.29399	.00002	.88889	.00008	.23866	.00017	.48732	.00031	58
4+ 1	2.32539	.00000	.30811	.00002	.89604	.00008	.24345	.00018	.49092	.00031	56
6	2.67757	.00000	.32201	.00002	.90313	.00008	.24821	.00018	.49450	.00031	54
8+ 2	2.92745	0.00000	5.33569	0.00002	5.91016	0.00008	6.25294	0.00018	6.49807	0.00031	52
10	3.12127	.00000	.34916	.00002	.91714	.00008	.25765	.00018	.50162	.00032	50
12+ 3	3.27963	.00000	.36242	.00002	.92406	.00008	.26233	.00018	.50516	.00032	48
14	3.41353	.00000	.37548	.00002	.93093	.00009	.26699	.00018	.50868	.00032	46
16+ 4	3.52951	0.00000	5.38835	0.00002	5.93774	0.00009	6.27162	0.00019	6.51219	0.00033	44
18	3.63182	.00000	.40103	.00003	.94450	.00009	.27623	.00019	.51568	.00033	42
20+ 5	3.72333	.00000	.41352	.00003	.95121	.00009	.28081	.00019	.51916	.00033	40
22	3.80612	.00000	.42585	.00003	.95786	.00009	.28537	.00019	.52263	.00033	38
24+ 6	3.88169	0.00000	5.43799	0.00003	5.96447	0.00009	6.28991	0.00019	6.52608	0.00034	36
26	3.95122	.00000	.44997	.00003	.97102	.00009	29442	.00020	.52952	.00034	34
28+ 7	4.01559	.00000	.46179	.00003	.97753	.00010	.29891	.00020	.53295	.00034	32
30	4.07551	.00000	.47345	.00003	.98399	.00010	.30337	.00020	.53636	.00034	30
32+ 8	4.13157	0.00000	5.48496	0.00003	5.99040	0.00010	6.30781	0.00020	6.53976	0.00035	28
34	.18423	.00000	.49631	.00003	5.99676	.00010	.31223	.00021	.54315	.00035	26
36+ 9	.23388	.00000	.50752	.00003	6.00308	.00010	.31663	.00021	.54652	.00035	24
38	.28084	.00000	.51858	.00003	.00935	.00010	.32101	.00021	.54988	.00035	22
40+10	4.32539	0.00000	5.52951	0.00003	6.01557	0.00010	6.32536	0.00021	6.55323	0.00036	20
42	.36777	.00000	.54030	.00003	.02176	.00011	.32969	.00021	.55656	.00036	18
44+11	.40818	.00000	.55095	.00004	.02789	.00011	.33400	.00022	.55988	.00036	16
46	.44679	.00000	.56148	.00004	.03399	.00011	.33829	.00022	.56319	.00037	14
48+12	4.48375	0.00000	5.57189	0.00004	6.04004	0.00011	6.34256	0.00022	6.56649	0.00037	12
50	.51921	.00000	.58216	.00004	.04605	.00011	.34681	.00022	.56977	.00037	10
52+13	.55328	.00000	.59232	.00004	.05202	.00011	.35103	.00022	.57304	.00037	8
54	.58606	.00000	.60236	.00004	.05795	.00011	.35524	.00023	.57630	.00038	6
56+14	4.61765	0.00000	5.61229	0.00004	6.06384	0.00012	6.35943	0.00023	6.57955	0.00038	4
58	4.64813	0.00000	5.62211	0.00004	6.06969	0.00012	6.36359	0.00023	6.58278	0.00038	2
	$23^h\ 59^m$		$23^h\ 57^m$		$23^h\ 55^m$		$23^h\ 53^m$		$23^h\ 51^m$		

s ′	$0^h\ 1^m$ 0° 0′		$0^h\ 3^m$ 0° 30′		$0^h\ 5^m$ 1° 0′		$0^h\ 7^m$ 1° 30′		$0^h\ 9^m$ 2° 0′		s
0+15	4.67757	0.00000	5.63181	0.00004	6.07550	0.00012	6.36774	0.00023	6.58600	0.00039	60
2	.70605	.00000	.64141	.00004	.08127	.00012	.37186	.00024	.58921	.00039	58
4+16	.73363	.00001	.65090	.00004	.08700	.00012	.37597	.00024	.59241	.00039	56
6	.76036	.00001	.66029	.00005	.09270	.00012	.38006	.00024	.59560	.00039	54
8+17	4.78629	0.00001	5.66958	0.00005	6.09836	0.00013	6.38412	0.00024	6.59878	0.00040	52
10	.81147	.00001	.67877	.00005	.10398	.00013	.38817	.00024	.60194	.00040	50
12+18	.83594	.00001	.68787	.00005	.10956	.00013	.39220	.00025	.60509	.00040	48
14	.85973	.00001	.69687	.00005	.11511	.00013	.39622	.00025	.60823	.00041	46
16+19	4.88290	0.00001	5.70578	0.00005	6.12063	0.00013	6.40021	0.00025	6.61136	0.00041	44
18	.90546	.00001	.71460	.00005	.12611	.00013	.40418	.00025	.61448	.00041	42
20+20	.92745	.00001	.72332	.00005	.13155	.00014	.40814	.00026	.61759	.00041	40
22	.94890	.00001	.73197	.00005	.13696	.00014	.41208	.00026	.62068	.00042	38
24+21	4.96983	0.00001	5.74052	0.00006	6.14234	0.00014	6.41600	0.00026	6.62377	0.00042	36
26	4.99027	.00001	.74900	.00006	.14769	.00014	.41990	.00026	.62684	.00042	34
28+22	5.01024	.00001	.75739	.00000	.15300	.00014	.42379	.00027	.62991	.00043	32
30	.02976	.00001	.76570	.00000	.15828	.00014	.42766	.00027	.63296	.00043	30
32+23	5.04885	0.00001	5.77394	0.00000	6.16353	0.00015	6.43151	0.00027	6.63600	0.00043	28
34	.06753	.00001	.78209	.00000	.16874	.00015	.43534	.00027	.63903	.00044	26
36+24	.08581	.00001	.79017	.00006	.17393	.00015	.43916	.00027	.64205	.00044	24
38	.10372	.00001	.79818	.00006	.17908	.00015	.44296	.00028	.64504	.00044	22
40+25	5.12127	0.00001	5.80611	0.00006	6.18421	0.00015	6.44675	0.00028	6.64806	0.00044	20
42	.13847	.00001	.81397	.00007	.18930	.00015	.45052	.00028	.65105	.00045	18
44+26	.15534	.00001	.82176	.00007	.19437	.00016	.45427	.00028	.65403	.00045	16
46	.17188	.00001	.82948	.00007	.19940	.00016	.45800	.00029	.65700	.00045	14
48+27	5.18812	0.00002	5.83713	0.00007	6.20441	0.00016	6.46172	0.00029	6.65996	0.00046	12
50	.20406	.00002	.84472	.00007	.20938	.00016	.46543	.00029	.66291	.00046	10
52+28	.21971	.00002	.85224	.00007	.21433	.00016	.46911	.00029	.66585	.00046	8
54	.23508	.00002	.85969	.00007	.21925	.00017	.47279	.00030	.66878	.00047	6
56+29	5.25019	0.00002	5.86709	0.00007	6.22415	0.00017	6.47644	0.00030	6.67170	0.00047	4
58	.26503	.00002	.87442	.00008	.22901	.00017	.48008	.00030	.67461	.00047	2
60+30	5.27963	0.00002	5.88168	0.00008	6.23385	0.00017	6.48371	0.00030	6.67751	0.00048	0
	$23^h\ 58^m$		$23^h\ 56^m$		$23^h\ 54^m$		$23^h\ 52^m$		$23^h\ 50^m$		

TABLE 45.

Haversines.

s ′	$0^h\ 10^m$ 2° 30′		$0^h\ 12^m$ 3° 0′		$0^h\ 14^m$ 3° 30′		$0^h\ 16^m$ 4° 0′		$0^h\ 18^m$ 4° 30′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0 0	6.67751	**0.00048**	6.83584	**0.00069**	6.96970	**0.00093**	7.08564	**0.00122**	7.18790	**0.00154**	60
2	.68040	**.00048**	.83825	**.00069**	.97176	**.00094**	.08745	**.00122**	.18950	**.00155**	58
4+ 1	.68328	**.00048**	.84065	**.00009**	.97382	**.00094**	.08925	**.00123**	.19111	**.00155**	56
6	.68615	**.00049**	.84304	**.00070**	.97588	**.00095**	.09105	**.00123**	.19271	**.00156**	54
8+ 2	6.68901	**0.00049**	6.84543	**0.00070**	6.97793	**0.00095**	7.09284	**0.00124**	7.19430	**0.00156**	52
10	.69186	**.00049**	.84782	**.00070**	.97997	**.00095**	.09464	**.00124**	.19590	**.00157**	50
12+ 3	.69470	**.00050**	.85019	**.00071**	.98201	**.00096**	.09642	**.00125**	.19749	**.00158**	48
14	.69754	**.00050**	.85256	**.00071**	.98405	**.00096**	.09821	**.00125**	.19908	**.00158**	46
16+ 4	6.70036	**0.00050**	6.85492	**0.00072**	6.98608	**0.00097**	7.09999	**0.00126**	7.20066	**0.00159**	44
18	.70318	**.00050**	.85728	**.00072**	.98811	**.00097**	.10177	**.00126**	.20225	**.00159**	42
20+ 5	.70598	**.00051**	.85963	**.00072**	.99013	**.00098**	.10354	**.00127**	.20383	**.00160**	40
22	.70878	**.00051**	.86197	**.00073**	.99214	**.00098**	.10531	**.00127**	.20540	**.00160**	38
24+ 6	6.71157	**0.00051**	6.86431	**0.00073**	6.99416	**0.00099**	7.10708	**0.00128**	7.20698	**0.00161**	36
26	.71435	**.00052**	.86664	**.00074**	6.99616	**.00099**	.10884	**.00128**	.20855	**.00162**	34
28+ 7	.71712	**.00052**	.86897	**.00074**	6.99817	**.00100**	.11060	**.00129**	.21012	**.00162**	32
30	.71988	**.00052**	.87129	**.00074**	7.00017	**.00100**	.11236	**.00130**	.21168	**.00163**	30
32+ 8	6.72263	**0.00053**	6.87360	**0.00075**	7.00216	**0.00101**	7.11411	**0.00130**	7.21325	**0.00163**	28
34	.72537	**.00053**	.87591	**.00075**	.00415	**.00101**	.11586	**.00131**	.21481	**.00164**	26
36+ 9	.72811	**.00053**	.87821	**.00076**	.00613	**.00101**	.11760	**.00131**	.21636	**.00165**	24
38	.73084	**.00054**	.88050	**.00076**	.00811	**.00102**	.11934	**.00132**	.21792	**.00165**	22
40+10	6.73355	**0.00054**	6.88279	**0.00076**	7.01009	**0.00102**	7.12108	**0.00132**	7.21947	**0.00166**	20
42	.73626	**.00054**	.88507	**.00077**	.01206	**.00103**	.12282	**.00133**	.22102	**.00166**	18
44+11	.73896	**.00055**	.88735	**.00077**	.01403	**.00103**	.12455	**.00133**	.22256	**.00167**	16.
46	.74166	**.00055**	.88962	**.00078**	.01599	**.00104**	.12627	**.00134**	.22411	**.00168**	14
48+12	6.74434	**0.00056**	6.89188	**0.00078**	7.01795	**0.00104**	7.12800	**0.00134**	7.22565	**0.00168**	12
50	.74702	**.00056**	.89414	**.00078**	.01990	**.00105**	.12972	**.00135**	.22718	**.00169**	10
52+13	.74969	**.00056**	.89639	**.00079**	.02185	**.00105**	.13144	**.00135**	.22872	**.00169**	8
54	.75235	**.00057**	.89864	**.00079**	.02379	**.00106**	.13315	**.00136**	.23025	**.00170**	6
56+14	6.75500	**0.00057**	6.90088	**0.00080**	7.02573	**0.00106**	7.13486	**0.00136**	7.23178	**0.00171**	4
58	6.75764	**0.00057**	6.90312	**0.00080**	7.02767	**0.00107**	7.13657	**0.00137**	7.23331	**0.00171**	2
	$23^h\ 59^m$		$23^h\ 47^m$		$23^h\ 45^m$		$23^h\ 43^m$		$23^h\ 41^m$		

s ′	$0^h\ 11^m$ 2° 30′		$0^h\ 13^m$ 3° 0′		$0^h\ 15^m$ 3° 30′		$0^h\ 17^m$ 4° 0′		$0^h\ 19^m$ 4° 30′		s
0+15	6.76028	**0.00058**	6.90535	**0.00080**	7.02960	**0.00107**	7.13827	**0.00137**	7.23483	**0.00172**	60
2	.76290	**.00058**	.90757	**.00081**	.03153	**.00108**	.13997	**.00138**	.23635	**.00172**	58
4+16	.76552	**.00058**	.90979	**.00081**	.03345	**.00108**	.14167	**.00139**	.23787	**.00173**	56
6	.76814	**.00059**	.91200	**.00082**	.03537	**00108**	.14337	**.00139**	.23939	**.00174**	54
8+17	6.77074	**0.00059**	6.91421	**0.00082**	7.03729	**0.00109**	7.14506	**0.00140**	7.24090	**0.00174**	52
10	.77334	**.00059**	.91641	**.00082**	.03920	**.00109**	.14674	**.00140**	.24241	**.00175**	50
12+18	.77592	**.00000**	.91860	**.00083**	.04110	**.00110**	.14843	**.00141**	.24392	**.00175**	48
14	.77851	**.00000**	.92079	**.00083**	.04300	**.00110**	.15011	**.00141**	.24543	**.00176**	46
16+19	6.78108	**0.00060**	6.92298	**0.00084**	7.04490	**0.00111**	7.15179	**0.00142**	7.24693	**0.00177**	44
18	.78364	**.00001**	.92516	**.00084**	.04680	**.00111**	.15346	**.00142**	.24843	**.00177**	42
20+20	.78620	**.00061**	.92733	**.00085**	.04869	**.00112**	.15513	**.00143**	.24993	**.00178**	40
22	.78875	**.00061**	.92950	**.00085**	.05057	**.00112**	.15680	**.00143**	.25143	**.00178**	38
24+21	6.79129	**0.00062**	6.93166	**0.00085**	7.05245	**0.00113**	7.15846	**0.00144**	7.25292	**0.00179**	36
26	.79383	**.00062**	.93382	**.00086**	.05433	**.00113**	.16013	**.00145**	.25441	**.00180**	34
28+22	.79630	**.00063**	.93597	**.00086**	.05620	**.00114**	.16178	**.00145**	.25590	**.00180**	32
30	.79888	**.00063**	.93812	**.00087**	.05807	**.00114**	.16344	**.00146**	.25738	**.00181**	30
32+23	6.80139	**0.00063**	6.94026	**0.00087**	7.05994	**0.00115**	7.16509	**0.00146**	7.25886	**0.00181**	28
34	.80390	**.00064**	.94239	**.00088**	.06180	**.00115**	.16674	**.00147**	.26034	**.00182**	26
36+24	.80640	**.00064**	.94453	**.00088**	.06366	**.00116**	.16839	**.00147**	.26182	**.00183**	24
38	.80889	**.00064**	.94665	**.00088**	.06551	**.00116**	.17003	**.00148**	.26330	**.00183**	22
40+25	6.81137	**0.00065**	6.94877	**0.00089**	7.06736	**0.00117**	7.17167	**0.00148**	7.26477	**0.00184**	20
42	.81385	**.00065**	.95089	**.00089**	.06920	**.00117**	.17331	**.00149**	.26624	**.00185**	18
44+26	.81632	**.00066**	.95300	**.00090**	.07105	**.00118**	.17494	**.00150**	.26771	**.00185**	16
46	.81879	**.00066**	.95510	**.00090**	.07288	**.00118**	.17657	**.00150**	.26917	**.00186**	14
48+27	6.82124	**0.00066**	6.95720	**0.00091**	7.07472	**0.00119**	7.17820	**0.00151**	7.27064	**0.00186**	12
50	.82369	**.00067**	.95930	**.00091**	.07655	**.00119**	.17982	**.00151**	.27210	**.00187**	10
52+28	.82614	**.00067**	.96139	**.00091**	.07837	**.00120**	.18144	**.00152**	.27355	**.00188**	8
54	.82857	**.00067**	.96347	**.00092**	.08019	**.00120**	.18306	**.00152**	.27501	**.00188**	6
56+29	6.83100	**0.00068**	6.96555	**0.00092**	7.08201	**0.00121**	7.18468	**0.00153**	7.27646	**0.00189**	4
58	.83342	**.00068**	.66763	**.00093**	.08383	**.00121**	.18629	**.00154**	.27791	**.00190**	2
60+30	6.83584	**0.00060**	6.96970	**0.00093**	7.08564	**0.00122**	7.18790	**0.00154**	7.27936	**0.00190**	0
	$23^h\ 48^m$		$23^h\ 46^m$		$23^h\ 44^m$		$23^h\ 42^m$		$23^h\ 40^m$		

TABLE 45.

Haversines.

s	′	$0^h\,20^m$ 5° 0′		$0^h\,22^m$ 5° 30′		$0^h\,24^m$ 6° 0′		$0^h\,26^m$ 6° 30′		$0^h\,28^m$ 7° 0′		
s	′	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	0	7:27936	**0.00190**	7.36209	**0.00230**	7.43760	**0.00274**	7.50706	**0.00321**	7.57135	**0.00373**	60
2		.28080	**.00191**	.36340	**.00231**	.43880	**.00275**	.50817	**.00322**	.57238	**.00374**	58
4	+ 1	.28225	**.00192**	.36471	**.00232**	.44001	**.00275**	.50928	**.00323**	.57341	**.00374**	56
6		.28369	**.00192**	.36602	**.00232**	.44121	**.00276**	.51039	**.00324**	.57444	**.00375**	54
8	+ 2	7.28513	**0.00193**	7.36733	**0.00233**	7.44241	**0.00277**	7.51149	**0.00325**	7.57547	**0.00376**	52
10		.28656	**.00193**	.36864	**.00234**	.44361	**.00278**	.51260	**.00326**	.75650	**.00377**	50
12	+ 3	.28800	**.00194**	.36994	**.00234**	.44480	**.00278**	.51370	**.00326**	.57752	**.00378**	48
14		.28943	**.00195**	.37124	**.00235**	.44600	**.00279**	.51481	**.00327**	.57855	**.00379**	46
16	+ 4	7.29086	**0.00195**	7.37254	**0.00236**	7.44719	**0.00280**	7.51591	**0.00328**	7.57957	**0.00380**	44
18		.29228	**.00196**	.37384	**.00237**	.44838	**.00281**	.51701	**.00329**	.58060	**.00381**	42
20	+ 5	.29371	**.00197**	.37514	**.00237**	.44957	**.00282**	.51811	**.00330**	.58162	**.00382**	40
22		.29513	**.00197**	.37643	**.00238**	.45076	**.00282**	.51921	**.00331**	.58264	**.00383**	38
24	+ 6	7.29655	**0.00198**	7.37773	**0.00239**	7.45194	**0.00283**	7.52030	**0.00331**	7.58366	**0.00383**	36
26		.29797	**.00199**	.37902	**.00239**	.45313	**.00284**	.52140	**.00332**	.58467	**.00384**	34
28	+ 7	.29938	**.00199**	.38030	**.00240**	.45431	**.00285**	.52249	**.00333**	.58569	**.00385**	32
30		.30079	**.00200**	.38159	**.00241**	.45549	**.00285**	.52358	**.00334**	.58670	**.00386**	30
32	+ 8	7.30220	**0.00201**	7.38288	**0.00241**	7.45667	**0.00286**	7.52467	**0.00335**	7.58772	**0.00387**	28
34		.30361	**.00201**	.38416	**.00242**	.45785	**.00287**	.52576	**.00336**	.58873	**.00388**	26
36	+ 9	.30502	**.00202**	.38544	**.00243**	.45903	**.00288**	.52685	**.00336**	.58974	**.00389**	24
38		.30642	**.00203**	.38672	**.00244**	.46020	**.00289**	.52794	**.00337**	.59075	**.00390**	22
40	+10	7.30782	**0.00203**	7.38800	**0.00244**	7.46138	**0.00289**	7.52902	**0.00338**	7.59176	**0.00391**	20
42		.30922	**.00204**	.38927	**.00245**	.46255	**.00290**	.53011	**.00339**	.59277	**.00392**	18
44	+11	.31062	**.00204**	.39054	**.00246**	.46372	**.00291**	.35119	**.00340**	.59378	**.00392**	16
46		.31201	**.00205**	.39182	**.00247**	.46489	**.00292**	.53227	**.00341**	.59478	**.00393**	14
48	+12	7.31340	**0.00206**	7.39309	**0.00247**	7.46605	**0.00292**	7.53335	**0.00341**	7.59579	**0.00394**	12
50		.31479	**.00206**	.39435	**.00248**	.46722	**.00293**	.53443	**.00342**	.59679	**.00395**	10
52	+13	.31618	**.00207**	.39562	**.00249**	.46838	**.00294**	.53550	**.00343**	.59779	**.00396**	8
54		.31757	**.00208**	.39688	**.00249**	.46955	**.00295**	.53658	**.00344**	.59879	**.00397**	6
56	+14	7.31895	**0.00208**	7.39815	**0.00250**	7.47071	**0.00296**	7.53766	**0.00345**	7.59979	**0.00398**	4
58		7.32033	**0.00209**	7.39941	**0.00251**	7.47187	**0.00296**	7.53873	**0.00346**	7.60079	**0.00399**	2
		$23^h\,39^m$		$23^h\,37^m$		$23^h\,35^m$		$23^h\,33^m$		$23^h\,31^m$		

s	′	$0^h\,21^m$ 5° 0′		$0^h\,23^m$ 5° 30′		$0^h\,25^m$ 6° 0′		$0^h\,27^m$ 6° 30′		$0^h\,29^m$ 7° 0′		s
0	+15	7.32171	**0.00210**	7.40067	**0.00252**	7.47302	**0.00297**	7.53980	**0.00347**	7.60179	**0.00400**	60
2		.32309	**.00210**	.40192	**.00252**	.47418	**.00288**	.54087	**.00347**	.60279	**.00401**	58
4	+16	.32446	**.00211**	.40318	**.00253**	.47533	**.00299**	.54194	**.00348**	.60378	**.00402**	56
6		,32583	**.00212**	.40443	**.00254**	.47649	**.00300**	.54301	**.00349**	.60478	**.00403**	54
8	+17	7.32720	**0.00212**	7.40568	**0.00255**	7.47764	**0.00300**	7.54407	**0.00350**	7.60577	**0.00403**	52
10		.32857	**.00213**	.40693	**.00255**	.47879	**.00301**	.54514	**.00351**	.60676	**.00404**	50
12	+18	.32994	**.00214**	.40818	**.00256**	.47994	**.00302**	.54620	**.00352**	.60775	**.00405**	48
14		.33130	**.00214**	.40943	**.00257**	.48109	**.00303**	.54727	**.00353**	.60874	**.00400**	46
16	+19	7.33266	**0.00215**	7.41067	**0.00257**	7.48223	**0.00394**	7.54833	**0.00353**	7.60973	**0.00407**	44
18		.33402	**.00216**	.41191	**.00258**	.48337	**.00304**	.54939	**.00354**	.61072	**.00408**	42
20	+20	.33538	**.00216**	.41315	**.00259**	.48452	**.00305**	.55045	**.00355**	.61170	**.00409**	40
22		.33673	**.00217**	.41439	**.00260**	.48566	**.00306**	.55150	**.00356**	.61269	**.00410**	38
24	+21	7.33809	**0.00218**	7.41563	**0.00260**	7.48680	**0.00307**	7.55256	**0.00357**	7.61367	**0.00411**	36
26		.33944	**.00218**	.41686	**.00261**	.48794	**.00308**	.55361	**.00358**	.61466	**.00412**	34
28	+22	.34079	**.00219**	.41810	**.00262**	.48907	**.00308**	.55467	**.00359**	.61564	**.00413**	32
30		.34213	**.00220**	.41933	**.00263**	.49021	**.00309**	.55572	**.00360**	.61662	**.00414**	30
32	+23	7.34348	**0.00221**	7.42056	**0.00263**	7.49134	**0.00310**	7.55677	**0.00360**	7.61760	**0.00415**	28
34		.34482	**.00221**	.42179	**.00264**	.49247	**.00311**	.55782	**.00361**	.61858	**.00416**	26
36	+24	.34616	**.00222**	.42301	**.00265**	.49360	**.00312**	.55887	**.00362**	.61955	**.00416**	24
38		.34750	**.00223**	.42424	**.00266**	.49473	**.00312**	.55992	**.00363**	.62053	**.00417**	22
40	+25	7.34884	**0.00223**	7.42546	**0.00266**	7.49586	**0.00313**	7.56096	**0.00364**	7.62151	**0.00418**	20
42		.35017	**.00224**	.42668	**.00267**	.49699	**.00314**	.56201	**.00365**	.62248	**.00419**	18
44	+26	.35150	**.00225**	.42790	**.00268**	.49811	**.00315**	.56305	**.00360**	.62345	**.00420**	16
46		.35283	**.00225**	.42912	**.00269**	.49923	**.00316**	.56409	**.00367**	.62442	**.00421**	14
48	+27	7.35416	**0.00226**	7.43034	**0.00269**	7.50036	**0.00316**	7.56513	**0.00367**	7.62540	**0.00422**	12
50		.35549	**.00227**	.43155	**.00270**	.50148	**.00317**	.56617	**.00368**	.62636	**.00423**	10
52	+28	.35681	**.00227**	.43277	**.00271**	.50259	**.00318**	.56721	**.00369**	.62733	**.00424**	8
54		.35813	**.00228**	.43398	**.00272**	.50371	**.00319**	.56825	**.00370**	.62830	**.00425**	6
56	+29	7.35945	**0.00229**	7.43519	**0.00272**	7.50483	**0.00320**	7.56928	**0.00371**	7.62927	**0.00426**	4
58		.36077	**.00229**	.43639	**.00273**	.50594	**.00321**	.57032	**.00372**	.63023	**.00427**	2
60	+30	7.36209	**0.00230**	7.43760	**0.00274**	7.50706	**0.00321**	7.57135	**0.00373**	7.63120	**0.00428**	0
		$23^h\,38^m$		$23^h\,36^m$		$23^h\,34^m$		$23^h\,32^m$		$23^h\,30^m$		

TABLE 45.

Haversines.

s ′	0h 30m 7° 30′		0h 32m 8° 0′		0h 34m 8° 30′		0h 36m 9° 0′		0h 38m 9° 30′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0 0	7.63120	0.00428	7.68717	0.00487	7.73974	0.00549	7.78929	0.00616	7.83615	0.00686	60
2	.63216	.00429	.68807	.00488	.74059	.00550	.79009	.00617	.83691	.00687	58
4+ 1	.63312	.00430	.68897	.00489	.74143	.00551	.79089	.00618	.83767	.00688	56
6	.63408	.00431	.68987	.00490	.74228	.00552	.79169	.00619	.83842	.00689	54
8+ 2	7.63504	0.00432	7.69077	0.00491	7.74313	0.00554	7.79249	0.00620	7.83918	0.00691	52
10	.63600	.00433	.69167	.00492	.74398	.00555	.79329	.00621	.83994	.00692	50
12+ 3	.63696	.00433	.69257	.00493	.74482	.00556	.79409	.00622	.84070	.00693	48
14	.63792	.00434	.69347	.00494	.74567	.00557	.79489	.00624	.84145	.00694	46
16+ 4	7.63887	0.00435	7.69437	0.00495	7.74651	0.00558	7.79568	0.00625	7.84221	0.00695	44
18	.63983	.00436	.69526	.00496	74735	.00559	.79648	.00626	.84296	.00697	42
20+ 5	.64078	.00437	.69616	.00497	.74819	.00560	.79728	.00627	.84372	.00698	40
22	.64173	.00438	.69705	.00498	.74904	.00561	.79807	.00628	.84447	.00699	38
24+ 6	7.64269	0.00439	7.69794	0.00499	7.74988	0.00562	7.79886	0.00629	7.84522	0.00700	36
26	.64364	.00440	.69883	.00500	.75072	.00563	.79966	.00630	.84597	.00701	34
28+ 7	.64458	.00441	.69972	.00501	.75155	.00564	.80045	.00632	.84672	.00703	32
30	.64553	.00442	.70061	.00502	.75239	.00565	.80124	.00633	.84747	.00704	30
32+ 8	7.64648	0.00443	7.70150	0.00503	7.75323	0.00567	7.80203	0.00634	7.84822	0.00705	28
34	.64743	.00444	.70239	.00504	.75407	.00568	.80282	.00635	.84897	.00706	26
36+ 9	.64837	.00445	.70328	.00505	.75490	.00569	.80361	.00636	.84972	.00707	24
38	.64932	.00446	.70416	.00506	.75574	.00570	.80440	.00637	.85047	.00709	22
40+10	7.65026	0.00447	7.70505	0.00507	7.75657	0.00571	7.80519	0.00639	7.85122	0.00710	20
42	.65120	.00448	.70593	.00508	.75740	.00572	.80598	.00640	.85196	.00711	18
44+11	.65214	.00449	.70682	.00509	.75824	.00573	.80677	.00641	.85271	.00712	16
46	.65308	.00450	.70770	.00510	.75907	.00574	.80755	.00642	.85346	.00714	14
48+12	7.65402	0.00451	7.70858	0.00511	7.75990	0.00575	7.80834	0.00643	7.85420	0.00715	12
50	.65496	.00452	.70946	.00512	.76073	.00576	.80912	.00644	.85494	.00716	10
52+13	.65590	.00453	.71034	.00513	.76156	.00578	.80991	.00646	.85569	.00717	8
54	.65683	.00454	.71122	.00514	.76239	.00579	.81069	.00647	.85643	.00719	6
56+14	7.65777	0.00455	7.71210	0.00515	7.76321	0.00580	7.81147	0.00648	7.85717	0.00720	4
58	7.65870	0.00456	7.71298	0.00516	7.76404	0.00581	7.81225	0.00649	7.85791	0.00721	2
	23h 29m		23h 27m		23h 25m		23h 23m		23h 21m		

s ′	0h 31m 7° 30′		0h 33m 8° 0′		0h 35m 8° 30′		0h 37m 9° 0′		0h 39m 9° 30′		s
0+15	7.65964	0.00457	7.71385	0.00517	7.76487	0.00582	7.81303	0.00650	7.85866	0.00722	60
2	.66057	.00458	.71473	.00518	.76569	.00583	.81382	.00651	.85940	.00723	58
4+16	.66150	.00459	.71560	.00520	.76652	.00584	.81459	.00653	.86014	.00725	56
6	.66243	.00460	.71648	.00521	.76734	.00585	.81537	.00654	.86087	.00726	54
8+17	7.66336	0.00461	7.71735	0.00522	7.76816	0.00586	7.81615	0.00655	7.86161	0.00727	52
10	.66429	.00462	.71822	.00523	.76898	.00587	.81693	.00656	.86235	.00728	50
12+18	.66521	.00463	.71909	.00524	.76981	.00589	.81771	.00657	.86309	.00730	48
14	.66614	.00464	.71996	.00525	.77063	.00590	.81848	.00658	.86382	.00731	46
16+19	7.66706	0.00465	7.72083	0.00526	7.77145	0.00591	7.81926	0.00660	7.86456	0.00732	44
18	.66799	.00466	.72170	.00527	.77227	.00592	.82003	.00661	.86530	.00733	42
20+20	.66891	.00467	.72257	.00528	.77308	.00593	.82081	.00662	.86603	.00735	40
22	.66983	.00468	.72343	.00529	.77390	.00594	.82158	.00663	.86676	.00736	38
24+21	7.67075	0.00469	7.72430	0.00530	7.77472	0.00595	7.82235	0.00664	7.86750	0.00737	36
26	.67167	.00470	.72516	.00531	.77553	.00596	.82313	.00665	.86823	.00738	34
28+22	.67259	.00471	.72603	.00532	.77635	.00598	.82390	.00667	.86896	.00740	32
30	.67351	.00472	.72689	.00533	.77716	.00599	.82467	.00668	.86969	.00741	30
32+23	7.67443	0.00473	7.72775	0.00534	7.77798	0.00600	7.82544	0.00669	7.87042	0.00742	28
34	.67535	.00474	.72861	.00535	.77879	.00601	.82621	.00670	.87115	.00743	26
36+24	.67626	.00475	.72948	.00536	.77960	.00602	.82698	.00671	.87188	.00745	24
38	.67718	.00476	.73034	.00537	.78041	.00603	.82774	.00673	.87261	.00746	22
40+25	7.67809	0.00477	7.73119	0.00539	7.78122	0.00604	7.82851	0.00674	7.87334	0.00747	20
42	.67900	.00478	.73205	.00540	.78203	.00605	.82928	.00675	.87407	.00748	18
44+26	.67991	.00479	.73291	.00541	.78284	.00607	.83004	.00676	.87480	.00750	16
46	.68082	.00480	.73377	.00542	.78365	.00608	.83081	.00677	.87552	.00751	14
48+27	7.68173	0.00481	7.73462	0.00543	7.78446	0.00609	7.83157	0.00679	7.87625	0.00752	12
50	.68264	.00482	.73548	.00544	.78526	.00610	.83234	.00680	.87697	.00753	10
52+28	.68355	.00483	.73633	.00545	.78607	.00611	.83310	.00681	.87770	.00755	8
54	.68445	.00484	.73718	.00546	.78688	.00612	.83386	.00682	.87842	.00756	6
56+29	7.68536	0.00485	7.73803	0.00547	7.78768	0.00613	7.83463	0.00683	7.87915	0.00757	4
58	.68627	.00486	.73889	.00548	.78848	.00614	.83539	.00685	.87987	.00758	2
60+30	7.68717	0.00487	7.73974	0.00549	7.78929	0.00616	7.83615	0.00686	7.88059	0.00760	0
	23h 28m		23h 26m		23h 24m		23h 22m		23h 20m		

TABLE 45.

Haversines.

s	'	$0^h\ 40^m$ 10° 0′		$0^h\ 42^m$ 10° 30′		$0^h\ 44^m$ 11° 0′		$0^h\ 46^m$ 11° 30′		$0^h\ 48^m$ 12° 0′		s
		Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	0	7.88059	0.00760	7.92286	0.00837	7.96315	0.00919	8.00163	0.01004	8.03847	0.01093	60
2		.88131	.00761	.92354	.00839	.96380	.00920	.00226	.01005	.03907	.01094	58
4+	1	.88203	.00762	.92423	.00840	.96446	.00921	.00289	.01007	.03967	.01096	56
6		.88276	.00763	.92492	.00841	.96511	.00923	.00351	.01008	.04027	.01097	54
8+	2	7.88348	0.00765	7.92560	0.00843	7.96577	0.00924	8.00414	0.01010	8.04087	0.01099	52
10		.88419	.00766	.92629	.00844	.96642	.00926	.00476	.01011	.04147	.01100	50
12+	3	.88491	.00767	.92697	.00845	.96707	.00927	.00539	.01012	.04207	.01102	48
14		.88563	.00768	.92766	.00847	.96773	.00928	.00601	.01014	.04267	.01103	46
16+	4	7.88635	0.00770	7.92834	0.00848	7.96838	0.00930	8.00664	0.01015	8.04326	0.01105	44
18		.88707	.00771	.92902	.00849	.96903	.00931	.00726	.01017	.04386	.01106	42
20+	5	88778	.00772	.92970	.00851	.96968	.00933	.00788	.01018	.04446	.01108	40
22		.88850	.00774	.93039	.00852	.97033	.00934	.00851	.01020	.04506	.01109	38
24+	6	7.88921	0.00775	7.93107	0.00853	7.97098	0.00935	8.00913	0.01021	8.04565	0.01111	36
26		.88993	.00776	.93175	.00855	.97163	.00937	.00975	.01023	.04625	.01112	34
28+	7	.89064	.00777	.93243	.00856	.97228	.00938	.01037	.01024	.04684	.01114	32
30		.89135	.00779	.93311	.00857	.97293	.00940	.01099	.01026	.04744	.01115	30
32+	8	7.89207	0.00780	7.93379	0.00859	7.97358	0.00941	8.01161	0.01027	8.04803	0.01117	28
34		.89278	.00781	.93447	.00860	.97423	.00942	.01223	.01029	.04863	.01118	26
36+	9	.89349	.00783	.93514	.00861	.97478	.00944	.01285	.01030	.04922	.01120	24
38		.89420	.00784	.93582	.00863	.97552	.00945	.01347	.01032	.04981	.01122	22
40+	10	7.89491	0.00785	7.93650	0.00864	7.97617	0.00947	8.01409	0.01033	8.05041	0.01123	20
42		.89562	.00786	.93717	.00865	.97681	.00948	.01471	.01034	.05100	.01125	18
44+	11	.89633	.00788	.93785	.00867	.97746	.00949	.01532	.01036	.05159	.01126	16
46		.89704	.00789	.93852	.00868	.97810	.00951	.01594	.01037	.05218	.01128	14
48+	12	7.89775	0.00790	7.93920	0.00869	7.97875	0.00952	8.01656	0.01039	8.05277	0.01129	12
50		.89846	.00792	.93987	.00871	.97939	.00954	.01717	.01040	.05336	.01131	10
52+	13	.89916	.00793	.94055	.00872	.98003	.00955	.01779	.01042	.05395	.01132	8
54		.89987	.00794	.94122	.00873	.98068	.00956	.01840	.01043	.05454	.01134	6
56+	14	7.90057	0.00795	7.94189	0.00875	7.98132	0.00958	8.01902	0.01045	8.05513	0.01135	4
58		7.90128	0.00797	7.94257	0.00876	7.98196	0.00959	8.01963	0.01046	8.05572	0.01137	2
		$23^h\ 19^m$		$23^h\ 17^m$		$23^h\ 15^m$		$23^h\ 13^m$		$23^h\ 11^m$		

s	'	$0^h\ 41^m$ 10° 0′		$0^h\ 43^m$ 10° 30′		$0^h\ 45^m$ 11° 0′		$0^h\ 47^m$ 11° 30′		$0^h\ 49^m$ 12° 0′		s
0+	15	7.90198	0.00798	7.94324	0.00877	7.98260	0.00961	8.02025	0.01048	8.05631	0.01138	60
2		.90269	.00799	.94391	.00879	.98325	.00962	.02086	.01049	.05690	.01140	58
4+	16	.90339	.00801	.94458	.00880	.98389	.00964	.02148	.01051	.05749	.01142	56
6		.90409	.00802	.94525	.00882	.98453	.00965	.02209	.01052	.05808	.01143	54
8+	17	7.90480	0.00803	7.94592	0.00883	7.98517	0.00966	8.02270	0.01054	8.05866	0.01145	52
10		.90550	.00804	.94659	.00884	.98581	.00968	.02331	.01055	.05925	.01146	50
12+	18	.90620	.00806	.94726	.00886	.98644	.00969	.02392	.01057	.05984	.01148	48
14		.90690	.00807	.94792	.00887	.98708	.00971	.02453	.01058	.06042	.01149	46
16+	19	7.90760	0.00808	7.94859	0.00888	7.98772	0.00972	8.02515	0.01060	8.06101	0.01151	44
18		.90830	.00810	.94926	.00890	.98836	.00974	.02576	.01061	.06159	.01152	42
20+	20	.90900	.00811	.94992	.00891	.98899	.00975	.02637	.01063	.06218	.01154	40
22		.90970	.00812	.95059	.00892	.98963	.00976	.02697	.01064	.06276	.01155	38
24+	21	7.91039	0.00814	7.95126	0.00894	7.99027	0.00978	8.02758	0.01066	8.06335	0.01157	36
26		.91109	.00815	.95192	.00895	99090	.00979	.02819	.01067	.06393	.01159	34
28+	22	.91179	.00816	.95259	.00897	.99154	.00981	.02880	.01069	.06451	.01160	32
30		.91248	.00817	.95325	.00898	.99217	.00982	.02941	.01070	.06510	.01162	30
32+	23	7.91318	0.00819	7.95391	0.00899	7.99281	0.00984	8.03001	0.01072	8.06568	0.01163	28
34		.91387	.00820	.95458	.00901	.99344	.00985	.03062	.01073	.06626	.01165	26
36+	24	.91457	.00821	.95524	.00902	.99407	.00986	.03123	.01075	.06684	.01166	24
38		.91526	.00823	.95590	.00903	.99470	.00988	.03183	.01076	.06742	.01168	22
40+	25	7.91596	0.00824	7.95656	0.00905	7.99534	0.00989	8.03244	0.01078	8.06800	0.01170	20
42		.91665	.00825	.95722	.00906	.99597	.00991	.03304	.01079	.06859	.01171	18
44+	26	.91734	.00827	.95788	.00908	.99660	.00992	.03365	.01081	.06917	.01173	16
46		.91803	.00828	.95854	.00909	.99723	.00994	.03425	.01082	.06975	.01174	14
48+	27	7.91872	0.00829	7.95920	0.00910	7.99786	0.00995	8.03486	0.01084	8.07032	0.01176	12
50		.91941	.00831	.95986	.00912	.99849	.00997	.03546	.01085	.07090	.01177	10
52+	28	.92010	.00832	.96052	.00913	.99912	.00998	.03606	.01087	.07148	.01179	8
54		.92079	.00833	.96118	.00914	7.99975	.00999	.03666	.01088	.07206	.01180	6
56+	29	7.92148	0.00835	7.96183	0.00916	8.00038	0.01001	8.03727	0.01090	8.07264	0.01182	4
58		.92217	.00836	.96249	.00917	.00100	.01002	.03787	.01091	.07322	.01184	2
60+	30	7.92286	0.00837	7.96315	0.00919	8.00163	0.01004	8.03847	0.01093	8.07379	0.01185	0
		$23^h\ 18^m$		$23^h\ 16^m$		$23^h\ 14^m$		$23^h\ 12^m$		$23^h\ 10^m$		

7765°—11——21

TABLE 45.

Haversines.

s ′	0h 50m 12° 30′		0h 52m 13° 0′		0h 54m 13° 30′		0h 56m 14° 0′		0h 58m 14° 30′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0 0	8.07379	**0.01185**	8.10772	**0.01282**	8.14035	**0.01382**	8.17179	**0.01485**	8.20211	**0.01593**	60
2	.07437	**.01187**	.10827	**.01283**	.14089	**.01383**	.17230	**.01487**	.20261	**.01594**	58
4+ 1	.07494	**.01188**	.10883	**.01285**	.14142	**.01385**	.17282	**.01489**	.20310	**.01596**	56
6	.07552	**.01190**	.10938	**.01286**	.14195	**.01387**	.17333	**.01491**	.20360	**.01598**	54
8+ 2	8.07610	**0.01192**	8.10993	**0.01288**	8.14248	**0.01388**	8.17384	**0.01492**	8.20410	**0.01600**	52
10	.07667	**.01193**	.11049	**.01290**	.14302	**.01390**	.17436	**.01494**	.20459	**.01602**	50
12+ 3	.07725	**.01195**	.11104	**.01291**	.14355	**.01392**	.17487	**.01496**	.20509	**.01604**	48
14	.07782	**.01196**	.11159	**.01293**	.14408	**.01393**	.17538	**.01498**	.20558	**.01605**	46
16+ 4	8.07839	**0.01198**	8.11214	**0.01295**	8.14461	**0.01395**	8.17590	**0.01499**	8.20608	**0.01607**	44
18	.07897	**.01199**	.11269	**.01296**	.14514	**.01397**	.17641	**.01501**	.20657	**.01609**	42
20+ 5	.07954	**.01201**	.11324	**.01298**	.14567	**.01399**	.17692	**.01503**	.20706	**.01611**	40
22	.08011	**.01203**	.11379	**.01300**	.14620	**.01400**	.17743	**.01505**	.20756	**.01613**	38
24+ 6	8.08069	**0.01204**	8.11435	**0.01301**	8.14673	**0.01402**	8.17794	**0.01506**	8.20805	**0.01615**	36
26	.08126	**.01206**	.11490	**.01303**	.14726	**.01404**	.17845	**.01508**	.20854	**.01616**	34
28+ 7	.08183	**.01207**	.11544	**.01305**	.14779	**.01405**	.17896	**.01510**	.20904	**.01618**	32
30	.08240	**.01209**	.11599	**.01306**	.14832	**.01407**	.17947	**.01512**	.20953	**.01620**	30
32+ 8	8.08297	**0.01211**	8.11654	**0.01308**	8.14885	**0.01409**	8.17998	**0.01513**	8.21002	**0.01622**	28
34	.08354	**.01212**	.11709	**.01309**	.14938	**.01411**	.18049	**.01515**	.21051	**.01624**	26
36+ 9	.08411	**.01214**	.11764	**.01311**	.14991	**.01412**	.18100	**.01517**	.21100	**.01626**	24
38	.08468	**.01215**	.11819	**.01313**	.15043	**.01414**	.18151	**.01519**	.21149	**.01627**	22
40+10	8.08525	**0.01217**	8.11873	**0.01314**	8.15096	**0.01416**	8.18202	**0.01521**	8.21199	**0.01629**	20
42	.08582	**.01218**	.11928	**.01316**	.15149	**.01417**	.18253	**.01522**	.21248	**.01631**	18
44+11	.08639	**.01220**	.11983	**.01317**	.15201	**.01419**	.18303	**.01524**	.21297	**.01633**	16
46	.08696	**.01222**	.12038	**.01319**	.15254	**.01421**	.18354	**.01526**	.21346	**.01635**	14
48+12	8.08752	**0.01223**	8.12092	**0.01321**	8.15307	**0.01423**	8.18405	**0.01528**	8.21395	**0.01637**	12
50	.08809	**.01225**	.12147	**.01323**	.15359	**.01424**	.18455	**.01530**	.21444	**.01638**	10
52+13	.08866	**.01226**	.12201	**.01324**	.15412	**.01426**	.18506	**.01531**	.21493	**.01640**	8
54	.08922	**.01228**	.12256	**.01326**	.15464	**.01428**	.18557	**.01533**	.21541	**.01642**	6
56+14	8.08979	**0.01230**	8.12310	**0.01328**	8.15517	**0.01429**	8.18607	**0.01535**	8.21590	**0.01644**	4
58	8.09036	**0.01231**	8.12365	**0.01329**	8.15569	**0.01431**	8.18658	**0.01537**	8.21639	**0.01646**	2
	23h 9m		23h 7m		23h 5m		23h 3m		23h 1m		

s ′	0h 51m 12° 30′		0h 53m 13° 0′		0h 55m 13° 30′		0h 57m 14° 0′		0h 59m 14° 30′		s
0+15	8.09092	**0.01233**	8.12419	**0.01331**	8.15622	**0.01433**	8.18709	**0.01538**	8.21688	**0.01648**	60
2	.09149	**.01234**	.12473	**.01333**	.15674	**.01435**	.18759	**.01540**	.21737	**.01650**	58
4+16	.09205	**.01236**	.12528	**.01334**	.15726	**.01436**	.18810	**.01542**	.21785	**.01651**	56
6	.09262	**.01238**	.12582	**.01336**	.15779	**.01438**	.18860	**.01544**	.21834	**.01653**	54
8+17	8.09318	**0.01239**	8.12636	**0.01338**	8.15831	**0.01440**	8.18910	**0.01546**	8.21883	**0.01655**	52
10	.09374	**.01241**	.12691	**.01339**	.15883	**.01442**	.18961	**.01547**	.21932	**.01657**	50
12+18	.09431	**.01243**	.12745	**.01341**	.15935	**.01443**	.19011	**.01549**	.21980	**.01659**	48
14	.09487	**.01244**	.12799	**.01343**	.15987	**.01445**	.19062	**.01551**	.22029	**.01661**	46
16+19	8.09543	**0.01246**	8.12853	**0.01344**	8.16040	**0.01447**	8.19112	**0.01553**	8.22077	**0.01663**	44
18	.09600	**.01247**	.12907	**.01346**	.16092	**.01448**	.19162	**.01555**	.22126	**.01664**	42
20+20	.09656	**.01249**	.12961	**.01348**	.16144	**.01450**	.19212	**.01556**	.22175	**.01666**	40
22	.09712	**.01251**	.13015	**.01349**	.16196	**.01452**	.19263	**.01558**	.22223	**.01668**	38
24+21	8.09768	**0.01252**	8.13069	**0.01351**	8.16248	**0.01454**	8.19313	**0.01560**	8.22272	**0.01670**	36
26	.09824	**.01254**	.13123	**.01353**	.16300	**.01455**	.19363	**.01562**	.22320	**.01672**	34
28+22	.09880	**.01255**	.13177	**.01354**	.16352	**.01457**	.19413	**.01564**	.22368	**.01674**	32
30	.09936	**.01257**	.13231	**.01356**	.16404	**.01459**	.19463	**.01565**	.22417	**.01676**	30
32+23	8.09992	**0.01259**	8.13285	**0.01358**	8.16456	**0.01461**	8.19513	**0.01567**	8.22465	**0.01677**	28
34	.10048	**.01260**	.13339	**.01360**	.16508	**.01462**	.19563	**.01569**	.22514	**.01679**	26
36+24	.10104	**.01262**	.13392	**.01361**	.16559	**.01464**	.19613	**.01571**	.22562	**.01681**	24
38	.10160	**.01264**	.13446	**.01363**	.16611	**.01466**	.19663	**.01573**	.22610	**.01683**	22
40+25	8.10216	**0.01265**	8.13500	**0.01365**	8.16663	**0.01468**	8.19713	**0.01574**	8.22658	**0.01685**	20
42	.10271	**.01267**	.13554	**.01366**	.16715	**.01469**	.19763	**.01576**	.22707	**.01687**	18
44+26	.10327	**.01268**	.13607	**.01368**	.16766	**.01471**	.19813	**.01578**	.22755	**.01689**	16
46	.10383	**.01270**	.13661	**.01370**	.16818	**.01473**	.19863	**.01580**	.22803	**.01691**	14
48+27	8.10439	**0.01272**	8.13714	**0.01371**	8.16870	**0.01475**	8.19913	**0.01582**	8.22851	**0.01692**	12
50	.10494	**.01273**	.13768	**.01373**	.16921	**.01476**	.19963	**.01584**	.22899	**.01694**	10
52+28	.10550	**.01275**	.13822	**.01375**	.16973	**.01478**	.20012	**.01585**	.22947	**.01696**	8
54	.10605	**.01277**	.13875	**.01376**	.17024	**.01480**	.20062	**.01587**	.22996	**.01698**	6
56+29	8.10661	**0.01278**	8.13928	**0.01378**	8.17076	**0.01482**	8.20112	**0.01589**	8.23044	**0.01700**	4
58	.10716	**.01280**	.13982	**.01380**	.17127	**.01483**	.20162	**.01591**	.23092	**.01702**	2
60+30	8.10772	**0.01282**	8.14035	**0.01382**	8.17179	**0.01485**	8.20211	**0.01593**	8.23140	**0.01704**	0
	23h 8m		23h 6m		23h 4m		23h 2m		23h 0m		

TABLE 45.

Haversines.

	$1^{h}\,0^{m}$ 15° 0′		$1^{h}\,1^{m}$ 15° 15′		$1^{h}\,2^{m}$ 15° 30′		$1^{h}\,3^{m}$ 15° 45′		$1^{h}\,4^{m}$ 16° 0′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	8.23140	**.01704**	8.24567	**.01761**	8.25971	**.01818**	8.27352	**.01877**	8.28711	**.01937**	60
1	.23164	**.01705**	.24591	**.01762**	.25994	**.01819**	.27375	**.01878**	.28734	**.01938**	59
2	.23188	**.01706**	.24614	**.01763**	.26017	**.01820**	.27398	**.01879**	.28756	**.01939**	58
3	.23212	**.01707**	.24638	**.01764**	.26040	**.01821**	.27420	**.01880**	.28779	**.01940**	57
+ 1′	8.23235	**.01707**	8.24661	**.01764**	8.26064	**.01822**	8.27443	**.01881**	8.28801	**.01941**	56
5	.23259	**.01708**	.24685	**.01765**	.26087	**.01823**	.27466	**.01882**	.28823	**.01942**	55
6	.23283	**.01709**	.24708	**.01766**	.26110	**.01824**	.27489	**.01883**	.28846	**.01943**	54
7	.23307	**.01710**	.24732	**.01767**	.26133	**.01825**	.27512	**.01884**	.28868	**.01944**	53
+ 2′	8.23331	**.01711**	8.24755	**.01768**	8.26156	**.01826**	8.27534	**.01885**	8.28891	**.01945**	52
9	.23355	**.01712**	.24779	**.01769**	.26179	**.01827**	.27557	**.01886**	.28913	**.01946**	51
10	.23379	**.01713**	.24803	**.01770**	.26203	**.01828**	.27580	**.01887**	.28936	**.01947**	50
11	.23403	**.01714**	.24826	**.01771**	.26226	**.01829**	.27603	**.01888**	.28958	**.01948**	49
+ 3′	8.23427	**.01715**	8.24850	**.01772**	8.26249	**.01830**	8.27626	**.01889**	8.28980	**.01949**	48
13	.23451	**.01716**	.24873	**.01773**	.26272	**.01831**	.27648	**.01890**	.29003	**.01950**	47
14	.23475	**.01717**	.24897	**.01774**	.26295	**.01832**	.27671	**.01891**	.29025	**.01951**	46
15	.23499	**.01718**	.24920	**.01775**	.26318	**.01833**	.27694	**.01892**	.29048	**.01952**	45
+ 4′	8.23523	**.01719**	8.24944	**.01776**	8.26341	**.01834**	8.27717	**.01893**	8.29070	**.01953**	44
17	.23546	**.01720**	.24967	**.01777**	.26364	**.01835**	.27739	**.01894**	.29092	**.01954**	43
18	.23570	**.01721**	.24991	**.01778**	.26388	**.01836**	.27762	**.01895**	.29115	**.01955**	42
19	.23594	**.01722**	.25014	**.01779**	.26411	**.01837**	.27785	**.01896**	.29137	**.01956**	41
+ 5′	8.23618	**.01723**	8.25037	**.01780**	8.26434	**.01838**	8.27807	**.01897**	8.29159	**.01957**	40
21	.23642	**.01724**	.25061	**.01781**	.26457	**.01839**	.27830	**.01898**	.29182	**.01958**	39
22	.23666	**.01724**	.25084	**.01782**	.26480	**.01840**	.27853	**.01899**	.29204	**.01959**	38
23	.23690	**.01725**	.25108	**.01783**	.26503	**.01841**	.27876	**.01900**	.29226	**.01960**	37
+ 6′	8.23713	**.01726**	8.25131	**.01784**	8.26526	**.01842**	8.27898	**.01901**	8.29249	**.01961**	36
25	.23737	**.01727**	.25155	**.01785**	.26549	**.01843**	.27921	**.01902**	.29271	**.01962**	35
26	.23761	**.01728**	.25178	**.01786**	.26572	**.01844**	.27944	**.01903**	.29293	**.01963**	34
27	.23785	**.01729**	.25202	**.01787**	.26595	**.01845**	.27966	**.01904**	.29316	**.01964**	33
+ 7′	8.23809	**.01730**	8.25225	**.01788**	8.26618	**.01846**	8.27989	**.01905**	8.29338	**.01965**	32
29	.23832	**.01731**	.25248	**.01789**	.26641	**.01847**	.28012	**.01906**	.29360	**.01966**	31
30	.23856	**.01732**	.25272	**.01789**	.26664	**.01848**	.28034	**.01907**	.29383	**.01967**	30
31	.23880	**.01733**	.25295	**.01790**	.26687	**.01849**	.28057	**.01908**	.29405	**.01968**	29
+ 8′	8.23904	**.01734**	8.25319	**.01791**	8.26710	**.01850**	8.28080	**.01909**	8.29427	**.01969**	28
33	.23928	**.01735**	.25342	**.01792**	.26733	**.01851**	.28102	**.01910**	.29449	**.01970**	27
34	.23951	**.01736**	.25365	**.01793**	.26756	**.01852**	.28125	**.01911**	.29472	**.01971**	26
35	.23975	**.01737**	.25389	**.01794**	.26779	**.01853**	.28147	**.01912**	.29494	**.01972**	25
+ 9′	8.23999	**.01738**	8.25412	**.01795**	8.26802	**.01854**	8.28170	**.01913**	8.29516	**.01973**	24
37	.24022	**.01739**	.25435	**.01796**	.26825	**.01855**	.28193	**.01914**	.29539	**.01974**	23
38	.24046	**.01740**	.25459	**.01797**	.26848	**.01856**	.28215	**.01915**	.29561	**.01975**	22
39	.24070	**.01741**	.25482	**.01798**	.26871	**.01857**	.28238	**.01916**	.29583	**.01976**	21
+ 10′	8.24094	**.01742**	8.25505	**.01799**	8.26894	**.01858**	8.28260	**.01917**	8.29605	**.01977**	20
41	.24118	**.01743**	.25529	**.01800**	.26917	**.01859**	.28283	**.01918**	.29628	**.01978**	19
42	.24141	**.01743**	.25552	**.01801**	.26940	**.01860**	.28306	**.01919**	.29650	**.01979**	18
43	.24165	**.01744**	.25575	**.01802**	.26963	**.01861**	.28328	**.01920**	.29672	**.01980**	17
+ 11′	8.24189	**.01745**	8.25599	**.01803**	8.26986	**.01861**	8.28351	**.01921**	8.29694	**.01981**	16
45	.24212	**.01746**	.25622	**.01804**	.27009	**.01862**	.28373	**.01922**	.29716	**.01982**	15
46	.24236	**.01747**	.25645	**.01805**	.27032	**.01863**	.28396	**.01923**	.29739	**.01983**	14
47	.24260	**.01748**	.25669	**.01806**	.27055	**.01864**	.28418	**.01924**	.29761	**.01984**	13
+ 12′	8.24283	**.01749**	8.25692	**.01807**	8.27078	**.01865**	8.28441	**.01925**	8.29783	**.01985**	12
49	.24307	**.01750**	.25715	**.01808**	.27100	**.01866**	.28464	**.01926**	.29805	**.01986**	11
50	.24331	**.01751**	.25738	**.01809**	.27123	**.01867**	.28486	**.01927**	.29827	**.01987**	10
51	.24354	**.01752**	.25762	**.01810**	.27146	**.01868**	.28509	**.01928**	.29850	**.01988**	9
+ 13′	8.24378	**.01753**	8.25785	**.01811**	8.27169	**.01869**	8.28531	**.01929**	8.29872	**.01989**	8
53	.24402	**.01754**	.25808	**.01812**	.27192	**.01870**	.28554	**.01930**	.29894	**.01990**	7
54	.24425	**.01755**	.25831	**.01813**	.27215	**.01871**	.28576	**.01931**	.29916	**.01991**	6
55	.24449	**.01756**	.25855	**.01814**	.27238	**.01872**	.28599	**.01932**	.29938	**.01992**	5
+ 14′	8.24473	**.01757**	8.25878	**.01815**	8.27261	**.01873**	8.28621	**.01933**	8.29960	**.01993**	4
57	.24496	**.01758**	.25901	**.01816**	.27283	**.01874**	.28644	**.01934**	.29982	**.01994**	3
58	.24520	**.01759**	.25924	**.01817**	.27306	**.01875**	.28666	**.01935**	.30005	**.01995**	2
59	.24543	**.01760**	.25948	**.01818**	.27329	**.01876**	.28689	**.01936**	.30027	**.01997**	1
+ 15′	8.24567	**.01761**	8.25971	**.01818**	8.27352	**.01877**	8.28711	**.01937**	8.30049	**.01998**	0
	$22^{h}\,59^{m}$		$22^{h}\,58^{m}$		$22^{h}\,57^{m}$		$22^{h}\,56^{m}$		$22^{h}\,55^{m}$		

TABLE 45.

Haversines.

	$1^{h}\ 5^{m}$ 16° 15′		$1^{h}\ 6^{m}$ 16° 30′		$1^{h}\ 7^{m}$ 16° 45′		$1^{h}\ 8^{m}$ 17° 0′		$1^{h}\ 9^{m}$ 17° 15′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	8.30049	.01998	8.31366	.02059	8.32663	.02121	8.33940	.02185	8.35199	.02249	60
1	.30071	.01999	.31388	.02060	.32684	.02122	.33962	.02186	.35220	.02250	59
2	.30093	.02000	.31410	.02061	.32706	.02124	.33983	.02187	.35241	.02251	58
3	.30115	.02001	.31431	.02062	.32727	.02125	.34004	.02188	.35261	.02252	57
+ 1′	8.30137	.02002	8.31453	.02063	8.32749	.02126	8.34025	.02189	8.35282	.02253	56
5	.30159	.02003	.31475	.02064	.32770	.02127	.34046	.02190	.35303	.02254	55
6	.30182	.02004	.31497	.02065	.32792	.02128	.34067	.02191	.35324	.02255	54
7	.30204	.02005	.31518	.02066	.32813	.02129	.34088	.02192	.35345	.02257	53
+ 2′	8.30226	.02006	8.31540	.02067	8.32834	.02130	8.34109	.02193	8.35365	.02258	52
9	.30248	.02007	.31562	.02068	.32856	.02131	.34130	.02194	.35386	.02259	51
10	.30270	.02008	.31584	.02069	.32877	.02132	.34152	.02195	.35407	.02260	50
11	.30292	.02009	.31605	.02070	.32899	.02133	.34173	.02196	.35428	.02261	49
+ 3′	8.30314	.02010	8.31627	.02071	8.32920	.02134	8.34194	.02198	8.35449	.02262	48
13	.30336	.02011	.31649	.02072	.32941	.02135	.34215	.02199	.35469	.02263	47
14	.30358	.02012	.31670	.02074	.32963	.02136	.34236	.02200	.35490	.02264	46
15	.30380	.02013	.31692	.02075	.32984	.02137	.34257	.02201	.35511	.02265	45
+ 4′	8.30402	.02014	8.31714	.02076	8.33006	.02138	8.34278	.02202	8.35532	.02266	44
17	.30424	.02015	.31735	.02077	.33027	.02139	.34299	.02203	.35552	.02267	43
18	.30446	.02016	.31757	.02078	.33048	.02140	.34320	.02204	.35573	.02268	42
19	.30468	.02017	.31779	.02079	.33070	.02141	.34341	.02205	.35594	.02270	41
+ 5′	8.30490	.02018	8.31800	.02080	8.33091	.02142	8.34362	.02206	8.35614	.02271	40
21	.30512	.02019	.31822	.02081	.33112	.02143	.34383	.02207	.35635	.02272	39
22	.30534	.02020	.31844	.02082	.33134	.02145	.34404	.02208	.35656	.02273	38
23	.30556	.02021	.31865	.02083	.33155	.02146	.34425	.02209	.35677	.02274	37
+ 6′	8.30578	.02022	8.31887	.02084	8.33176	.02147	8.34446	.02210	8.35697	.02275	36
25	.30600	.02023	.31909	.02085	.33198	.02148	.34467	.02211	.35718	.02276	35
26	.30622	.02024	.31930	.02086	.33219	.02149	.34488	.02212	.35739	.02277	34
27	.30644	.02025	.31952	.02087	.33240	.02150	.34509	.02214	.35759	.02278	33
+ 7′	8.30666	.02026	8.31974	.02088	8.33262	.02151	8.34530	.02215	8.35780	.02279	32
29	.30688	.02027	.31995	.02089	.33283	.02152	.34551	.02216	.35801	.02280	31
30	.30710	.02028	.32017	.02090	.33304	.02153	.34572	.02217	.35821	.02281	30
31	.30732	.02029	.32039	.02091	.33325	.02154	.34593	.02218	.35842	.02283	29
+ 8′	8.30754	.02030	8.32060	.02092	8.33347	.02155	8.34614	.02219	8.35863	.02284	28
33	.30776	.02031	.32082	.02093	.33368	.02156	.34635	.02220	.35883	.02285	27
34	.30798	.02032	.32103	.02094	.33389	.02157	.34656	.02221	.35904	.02286	26
35	.30820	.02033	.32125	.02095	.33411	.02158	.34677	.02222	.35925	.02287	25
+ 9′	8.30842	.02034	8.32147	.02096	8.33432	.02159	8.34698	.02223	8.35945	.02288	24
37	.30863	.02035	.32168	.02097	.33453	.02160	.34719	.02224	.35966	.02289	23
38	.30885	.02036	.32190	.02098	.33474	.02161	.34740	.02225	.35987	.02290	22
39	.30907	.02037	.32211	.02099	.33496	.02162	.34761	.02226	.36007	.02291	21
+ 10′	8.30929	.02038	8.32233	.02101	8.33517	.02164	8.34782	.02227	8.36028	.02292	20
41	.30951	.02039	.32254	.02102	.33538	.02165	.34803	.02229	.36048	.02293	19
42	.30973	.02040	.32276	.02103	.33559	.02166	.34823	.02230	.36069	.02295	18
43	.30995	.02042	.32297	.02104	.33580	.02167	.34844	.02231	.36090	.02296	17
+ 11′	8.31017	.02043	8.32319	.02105	8.33602	.02168	8.34865	.02232	8.36110	.02297	16
45	.31039	.02044	.32341	.02106	.33623	.02169	.34886	.02233	.36131	.02298	15
46	.31060	.02045	.32362	.02107	.33644	.02170	.34907	.02234	.36151	.02299	14
47	.31082	.02046	.32384	.02108	.33665	.02171	.34928	.02235	.36172	.02300	13
+ 12′	8.31104	.02047	8.32405	.02109	8.33686	.02172	8.34949	.02236	8.36193	.02301	12
49	.31126	.02048	.32427	.02110	.33708	.02173	.34970	.02237	.36213	.02302	11
50	.31148	.02049	.32448	.02111	.33729	.02174	.34991	.02238	.36234	.02303	10
51	.31170	.02050	.32470	.02112	.33750	.02175	.35011	.02239	.36254	.02304	9
+ 13′	8.31192	.02051	8.32491	.02113	8.33771	.02176	8.35032	.02240	8.36275	.02305	8
53	.31213	.02052	.32513	.02114	.33792	.02177	.35053	.02241	.36295	.02307	7
54	.31235	.02053	.32534	.02115	.33814	.02178	.35074	.02243	.36316	.02308	6
55	.31257	.02054	.32556	.02116	.33835	.02179	.35095	.02244	.36337	.02309	5
+ 14′	8.31279	.02055	8.32577	.02117	8.33856	.02181	8.35116	.02245	8.36357	.02310	4
57	.31301	.02056	.32599	.02118	.33877	.02182	.35137	.02246	.36378	.02311	3
58	.31322	.02057	.32620	.02119	.33898	.02183	.35157	.02247	.36398	.02312	2
59	.31344	.02058	.32642	.02120	.33919	.02184	.35178	.02248	.36419	.02313	1
+ 15′	8.31366	.02059	8.32663	.02121	8.33940	.02185	8.35199	.02249	8.36439	.02314	0
	$22^{h}\ 54^{m}$		$22^{h}\ 53^{m}$		$22^{h}\ 52^{m}$		$22^{h}\ 51^{m}$		$22^{h}\ 50^{m}$		

TABLE 45.

Haversines.

s	$1^{h}\ 10^{m}$ 17 30′		$1^{h}\ 11^{m}$ 17° 45′		$1^{h}\ 12^{m}$ 18° 0′		$1^{h}\ 13^{m}$ 18° 15′		$1^{h}\ 14^{m}$ 18° 30′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	8.36439	**.02314**	8.37662	**.02380**	8.38867	**.02447**	8.40055	**.02515**	8.41226	**.02584**	60
1	.36460	**.02315**	.37682	**.02381**	.38886	**.02448**	.40074	**.02516**	.41246	**.02585**	59
2	.36480	**.02316**	.37702	**.02382**	.38906	**.02449**	.40094	**.02517**	.41265	**.02586**	58
3	.36501	**.02317**	.37722	**.02384**	.38926	**.02451**	.40114	**.02518**	.41284	**.02587**	57
+ 1′	8.36521	**.02319**	8.37742	**.02385**	8.38946	**.02452**	8.40133	**.02520**	8.41304	**.02588**	56
5	.36542	**.02320**	.37763	**.02386**	.38966	**.02453**	.40153	**.02521**	.41323	**.02590**	55
6	.36562	**.02321**	.37783	**.02387**	.38986	**.02454**	.40172	**.02522**	.41343	**.02591**	54
7	.36583	**.02322**	.37803	**.02388**	.39006	**.02455**	.40192	**.02523**	.41362	**.02592**	53
+ 2′	8.36603	**.02323**	8.37823	**.02389**	8.39026	**.02456**	8.40212	**.02524**	8.41381	**.02593**	52
9	.36624	**.02324**	.37843	**.02390**	.39046	**.02457**	.40231	**.02525**	.41401	**.02594**	51
10	.36644	**.02325**	.37864	**.02391**	.39066	**.02458**	.40251	**.02526**	.41420	**.02595**	50
11	.36665	**.02326**	.37884	**.02392**	.39086	**.02460**	.40271	**.02528**	.41439	**.02597**	49
+ 3′	8.36685	**.02327**	8.37904	**.02394**	8.39105	**.02461**	8.40290	**.02529**	8.41459	**.02598**	48
13	.36706	**.02328**	.37924	**.02395**	.39125	**.02462**	.40310	**.02530**	.41478	**.02599**	47
14	.36726	**.02329**	.37944	**.02396**	.39145	**.02463**	.40329	**.02531**	.41497	**.02600**	46
15	.36746	**.02331**	.37964	**.02397**	.39165	**.02464**	.40349	**.02532**	.41517	**.02601**	45
+ 4′	8.36767	**.02332**	8.37985	**.02398**	8.39185	**.02465**	8.40369	**.02533**	8.41536	**.02602**	44
17	.36787	**.02333**	.38005	**.02399**	.39205	**.02460**	.40388	**.02534**	.41555	**.02603**	43
18	.36808	**.02334**	.38025	**.02460**	.39225	**.02467**	.40408	**.02536**	.41575	**.02605**	42
19	.36828	**.02335**	.38045	**.02401**	.39245	**.02469**	.40427	**.02537**	.41594	**.02606**	41
+ 5′	8.36849	**.02336**	8.38065	**.02402**	8.39264	**.02470**	8.40447	**.02538**	8.41613	**.02607**	40
21	.36869	**.02337**	.38085	**.02404**	.39284	**.02471**	.40467	**.02539**	.41632	**.02608**	39
22	.36889	**.02338**	.38105	**.02405**	.39304	**.02472**	.40486	**.02540**	.41652	**.02600**	38
23	.36910	**.02339**	.38126	**.02406**	.39324	**.02473**	.40506	**.02541**	.41671	**.02610**	37
+ 6′	8.36930	**.02340**	8.38146	**.02407**	8.39344	**.02474**	8.40525	**.02542**	8.41690	**.02612**	36
25	.36951	**.02342**	.38166	**.02408**	.39364	**.02475**	.40545	**.02544**	.41710	**.02613**	35
26	.36971	**.02343**	.38186	**.02409**	.39384	**.02476**	.40564	**.02545**	.41729	**.02614**	34
27	.36991	**.02344**	.38206	**.02410**	.39403	**.02478**	.40584	**.02546**	.41748	**.02615**	33
+ 7′	8.37012	**.02345**	8.38226	**.02411**	8.39423	**.02479**	8.40603	**.02547**	8.41767	**.02616**	32
29	.37032	**.02346**	.38246	**.02412**	.39443	**.02480**	.40623	**.02548**	.41787	**.02617**	31
30	.37053	**.02347**	.38266	**.02414**	.39463	**.02481**	.40642	**.02549**	.41806	**.02619**	30
31	.37073	**.02348**	.38286	**.02415**	.39482	**.02482**	.40662	**.02550**	.41825	**.02620**	29
+ 8′	8.37093	**.02349**	8.38306	**.02416**	8.39502	**.02483**	8.40681	**.02552**	8.41845	**.02621**	28
33	.37114	**.02350**	.38326	**.02417**	.39522	**.02484**	.40701	**.02553**	.41864	**.02622**	27
34	.37134	**.02351**	.38346	**.02418**	.39542	**.02486**	.40721	**.02554**	.41883	**.02623**	26
35	.37154	**.02353**	.38367	**.02419**	.39562	**.02487**	.40740	**.02555**	.41902	**.02624**	25
+ 9′	8.37175	**.02354**	8.38387	**.02420**	8.39581	**.02488**	8.40760	**.02556**	8.41921	**.02626**	24
37	.37195	**.02355**	.38407	**.02421**	.39601	**.02489**	.40779	**.02557**	.41941	**.02627**	23
38	.37215	**.02356**	.38427	**.02423**	.39621	**.02490**	.40799	**.02559**	.41960	**.02628**	22
39	.37236	**.02357**	.38447	**.02424**	.39641	**.02491**	.40818	**.02560**	.41979	**.02629**	21
+ 10′	8.37256	**.02358**	8.38467	**.02425**	8.39660	**.02492**	8.40837	**.02561**	8.41998	**.02630**	20
41	.37276	**.02359**	.38487	**.02426**	.39680	**.02493**	.40857	**.02562**	.42018	**.02631**	19
42	.37297	**.02360**	.38507	**.02427**	.39700	**.02495**	.40876	**.02563**	.42037	**.02633**	18
43	.37317	**.02361**	.38527	**.02428**	.39720	**.02496**	.40896	**.02564**	.42056	**.02634**	17
+ 11′	8.37337	**.02363**	8.38547	**.02429**	8.39739	**.02497**	8.40915	**.02565**	8.42075	**.02635**	16
45	.37358	**.02364**	.38567	**.02430**	.39759	**.02498**	.40935	**.02567**	.42095	**.02630**	15
46	.37378	**.02365**	.38587	**.02431**	.39779	**.02499**	.40954	**.02568**	.42114	**.02637**	14
47	.37398	**.02366**	.38607	**.02433**	.39799	**.02560**	.40974	**.02569**	.42133	**.02638**	13
+ 12′	8.37419	**.02367**	8.38627	**.02434**	8.39818	**.02501**	8.40993	**.02570**	8.42152	**.02639**	12
49	.37439	**.02368**	.38647	**.02435**	.39838	**.02503**	.41013	**.02571**	.42171	**.02641**	11
50	.37459	**.02369**	.38667	**.02436**	.39858	**.02504**	.41032	**.02572**	.42190	**.02642**	10
51	.37479	**.02370**	.38687	**.02437**	.39877	**.02505**	.41052	**.02573**	.42210	**.02643**	9
+ 13′	8.37500	**.02371**	8.38707	**.02438**	8.39897	**.02506**	8.41071	**.02575**	8.42229	**.02644**	8
53	.37520	**.02372**	.38727	**.02439**	.39917	**.02507**	.41090	**.02576**	.42248	**.02645**	7
54	.37540	**.02374**	.38747	**.02440**	.39937	**.02508**	.41110	**.02577**	.42267	**.02646**	6
55	.37560	**.02375**	.38767	**.02442**	.39956	**.02509**	.41129	**.02578**	.42286	**.02648**	5
+ 14′	8.37581	**.02376**	8.38787	**.02443**	8.39976	**.02510**	8.41149	**.02579**	8.42305	**.02649**	4
57	.37601	**.02377**	.38807	**.02444**	.39996	**.02512**	.41168	**.02580**	.42324	**.02650**	3
58	.37621	**.02378**	.38827	**.02445**	.40015	**.02513**	.41187	**.02582**	.42344	**.02651**	2
59	.37641	**.02379**	.38847	**.02446**	.40035	**.02514**	.41207	**.02583**	.42363	**.02652**	1
+ 15′	8.37662	**.02380**	8.38867	**.02447**	8.40055	**.02515**	8.41226	**.02584**	8.42382	**.02653**	0
	$22^{h}\ 49^{m}$		$22^{h}\ 48^{m}$		$22^{h}\ 47^{m}$		$22^{h}\ 46^{m}$		$22^{h}\ 45^{m}$		

TABLE 45.

Haversines.

s	1h 15m 18° 45′		1h 16m 19° 0′		1h 17m 19° 15′		1h 18m 19° 30′		1h 19m 19° 45′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	8.42382	.02653	8.43522	.02724	8.44647	.02796	8.45757	.02868	8.46852	.02941	60
1	.42401	.02655	.43541	.02725	.44665	.02797	.45775	.02869	.46871	.02942	59
2	.42420	.02656	.43560	.02726	.44684	.02798	.45794	.02870	.46889	.02944	58
3	.42439	.02657	.43578	.02728	.44703	.02799	.45812	.02871	.46907	.02945	57
+ 1′	8.42458	.02658	8.43597	.02729	8.44721	.02800	8.45830	.02873	8.46925	.02946	56
5	.42477	.02659	.43616	.02730	.44740	.02802	.45849	.02874	.46943	.02947	55
6	.42497	.02661	.43635	.02731	.44758	.02803	.45867	.02875	.46961	.02949	54
7	.42516	.02662	.43654	.02732	.44777	.02804	.45885	.02876	.46979	.02950	53
+ 2′	8.42535	.02663	8.43673	.02734	8.44796	.02805	8.45904	.02878	8.46998	.02951	52
9	.42554	.02664	.43692	.02735	.44814	.02806	.45922	.02879	.47016	.02952	51
10	.42573	.02665	.43710	.02736	.44833	.02808	.45940	.02880	.47034	.02954	50
11	.42592	.02666	.43729	.02737	.44851	.02809	.45959	.02881	.47052	.02955	49
+ 3′	8.42611	.02668	8.43748	.02738	8.44870	.02810	8.45977	.02883	8.47070	.02956	48
13	.42630	.02669	.43767	.02739	.44889	.02811	.45995	.02884	.47088	.02957	47
14	.42649	.02670	.43786	.02741	.44907	.02812	.46014	.02885	.47106	.02958	46
15	.42668	.02671	.43805	.02742	.44926	.02814	.46032	.02886	.47124	.02960	45
+ 4′	8.42687	.02672	8.43823	.02743	8.44944	.02815	8.46050	.02887	8.47142	.02961	44
17	.42706	.02673	.43842	.02744	.44963	.02816	.46069	.02889	.47160	.02962	43
18	.42725	.02675	.43861	.02745	.44981	.02817	.46087	.02890	.47178	.02963	42
19	.42745	.02676	.43880	.02747	.45000	.02818	.46105	.02891	.47197	.02965	41
+ 5′	8.42764	.02677	8.43899	.02748	8.45018	.02820	8.46124	.02892	8.47215	.02966	40
21	.42783	.02678	.43917	.02749	.45037	.02821	.46142	.02893	.47233	.02967	39
22	.42802	.02679	.43936	.02750	.45055	.02822	.46160	.02895	.47251	.02968	38
23	.42821	.02680	.43955	.02751	.45074	.02823	.46179	.02896	.47269	.02970	37
+ 6′	8.42840	.02682	8.43974	.02753	8.45093	.02824	8.46197	.02897	8.47287	.02971	36
25	.42859	.02683	.43992	.02754	.45111	.02826	.46215	.02898	.47305	.02972	35
26	.42878	.02684	.44011	.02755	.45130	.02827	.46233	.02900	.47323	.02973	34
27	.42897	.02685	.44030	.02756	.45148	.02828	.46252	.02901	.47341	.02974	33
+ 7′	8.42916	.02686	8.44049	.02757	8.45167	.02829	8.46270	.02902	8.47359	.02976	32
29	.42935	.02688	.44067	.02759	.45185	.02830	.46288	.02903	.47377	.02977	31
30	.42954	.02689	.44086	.02760	.45204	.02832	.46306	.02904	.47395	.02978	30
31	.42973	.02690	.44105	.02761	.45222	.02833	.46325	.02906	.47413	.02979	29
+ 8′	8.42992	.02691	8.44124	.02762	8.45241	.02834	8.46343	.02907	8.47431	.02981	28
33	.43011	.02692	.44142	.02763	.45259	.02835	.46361	.02908	.47449	.02982	27
34	.43030	.02693	.44161	.02764	.45278	.02836	.46379	.02909	.47467	.02983	26
35	.43049	.02695	.44180	.02766	.45296	.02838	.46398	.02911	.47485	.02984	25
+ 9′	8.43068	.02696	8.44199	.02767	8.45315	.02839	8.46416	.02912	8.47503	.02986	24
37	.43087	.02697	.44217	.02768	.45333	.02840	.46434	.02913	.47521	.02987	23
38	.43106	.02698	.44236	.02769	.45352	.02841	.46452	.02914	.47539	.02988	22
39	.43125	.02699	.44255	.02771	.45370	.02842	.46471	.02915	.47557	.02989	21
+ 10′	8.43144	.02700	8.44273	.02772	8.45388	.02844	8.46489	.02917	8.47575	.02991	20
41	.43163	.02702	.44292	.02773	.45407	.02845	.46507	.02918	.47593	.02992	19
42	.43181	.02703	.44311	.02774	.45425	.02846	.46525	.02919	.47611	.02993	18
43	.43200	.02704	.44330	.02775	.45444	.02847	.46544	.02920	.47629	.02994	17
+ 11′	8.43219	.02705	8.44348	.02776	8.45462	.02849	8.46562	.02922	8.47647	.02996	16
45	.43238	.02706	.44367	.02778	.45481	.02850	.46580	.02923	.47665	.02997	15
46	.43257	.02708	.44386	.02779	.45499	.02851	.46598	.02924	.47683	.02998	14
47	.43276	.02709	.44404	.02780	.45518	.02852	.46616	.02925	.47701	.02999	13
+ 12′	8.43295	.02710	8.44423	.02781	8.45536	.02853	8.46634	.02926	8.47719	.03000	12
49	.43314	.02711	.44442	.02782	.45554	.02855	.46653	.02928	.47737	.03002	11
50	.43333	.02712	.44460	.02784	.45573	.02856	.46671	.02929	.47755	.03003	10
51	.43352	.02713	.44479	.02785	.45591	.02857	.46689	.02930	.47773	.03004	9
+ 13′	8.43371	.02715	8.44498	.02786	8.45610	.02858	8.46707	.02931	8.47791	.03005	8
53	.43390	.02716	.44516	.02787	.45628	.02859	.46725	.02933	.47809	.03007	7
54	.43409	.02717	.44535	.02788	.45646	.02861	.46744	.02934	.47827	.03008	6
55	.43427	.02718	.44554	.02790	.45665	.02862	.46762	.02935	.47844	.03009	5
+ 14′	8.43446	.02719	8.44572	.02791	8.45683	.02863	8.46780	.02936	8.47862	.03010	4
57	.43465	.02721	.44591	.02792	.45702	.02864	.46798	.02938	.47880	.03012	3
58	.43484	.02722	.44610	.02793	.45720	.02866	.46816	.02939	.47898	.03013	2
59	.43503	.02723	.44628	.02794	.45738	.02867	.46834	.02940	.47916	.03014	1
+ 15′	8.43522	.02724	8.44647	.02796	8.45757	.02868	8.46852	.02941	8.47934	.03015	0
	22h 44m		22h 43m		22h 42m		22h 41m		22h 40m		

TABLE 45.

Haversines.

	$1^{h}\ 20^{m}$ 20° 0′		$1^{h}\ 21^{m}$ 20° 15′		$1^{h}\ 22^{m}$ 20° 30′		$1^{h}\ 23^{m}$ 20° 45′		$1^{h}\ 24^{m}$ 21° 0′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	8.47934	.03015	8.49002	.03090	8.50056	.03166	8.51098	.03243	8.52127	.03321	60
1	.47952	.03017	.49020	.03092	.50074	.03168	.51115	.03245	.52144	.03322	59
2	.47970	.03018	.49037	.03093	.50091	.03169	.51132	.03246	.52161	.03324	58
3	.47988	.03019	.49055	.03094	.50109	.03170	.51150	.03247	.52178	.03325	57
+ 1′	8.48006	.03020	8.49073	.03095	8.50126	.03171	8.51167	.03248	8.52195	.03326	56
5	.48024	.03022	.49090	.03097	.50144	.03173	.51184	.03250	.52212	.03328	55
6	.48041	.03023	.49108	.03098	.50161	.03174	.51201	.03251	.52229	.03329	54
7	.48059	.03024	.49126	.03099	.50179	.03175	.51219	.03252	.52246	.03330	53
+ 2′	8.48077	.03025	8.49143	.03101	8.50196	.03177	8.51236	.03254	8.52263	.03331	52
9	.48095	.03027	.49161	.03102	.50214	.03178	.51253	.03255	.52280	.03333	51
10	.48113	.03028	.49179	.03103	.50231	.03179	.51270	.03256	.52297	.03334	50
11	.48131	.03029	.49196	.03164	.50248	.03180	.51287	.03257	.52314	.03335	49
+ 3′	8.48149	.03030	8.49214	.03106	8.50266	.03182	8.51305	.03259	8.52331	.03337	48
13	.48167	.03032	.49232	.03107	.50283	.03183	.51322	.03260	.52348	.03338	47
14	.48184	.03033	.49249	.03108	.50301	.03184	.51339	.03261	.52365	.03339	46
15	.48202	.03034	.49267	.03109	.50318	.03186	.51356	.03263	.52382	.03341	45
+ 4′	8.48220	.03035	8.49284	.03111	8.50335	.03187	8.51374	.03264	8.52399	.03342	44
17	.48238	.03037	.49302	.03112	.50353	.03188	.51391	.03265	.52416	.03343	43
18	.48256	.03038	.49320	.03113	.50370	.03189	.51408	.03266	.52433	.03344	42
19	.48274	.03039	.49337	.03114	.50388	.03191	.51425	.03268	.52450	.03346	41
+ 5′	8.48292	.03040	8.49355	.03116	8.50405	.03192	8.51442	.03269	8.52467	.03347	40
21	.48309	.03042	.49373	.03117	.50422	.03193	.51459	.03270	.52484	.03348	39
22	.48327	.03043	.49390	.03118	.50440	.03194	.51477	.03272	.52501	.03350	38
23	.48345	.03044	.49408	.03119	.50457	.03196	.51494	.03273	.52518	.03351	37
+ 6′	8.48363	.03045	8.49425	.03121	8.50475	.03197	8.51511	.03274	8.52535	.03352	36
25	.48381	.03047	.49443	.03122	.50492	.03198	.51528	.03275	.52552	.03354	35
26	.48399	.03048	.49461	.03123	.50509	.03200	.51545	.03277	.52569	.03355	34
27	.48416	.03049	.49478	.03125	.50527	.03201	.51562	.03278	.52585	.03356	33
+ 7′	8.48434	.03050	8.49496	.03126	8.50544	.03202	8.51580	.03279	8.52602	.03358	32
29	.48452	.03052	.49513	.03127	.50561	.03204	.51597	.03281	.52619	.03359	31
30	.48470	.03053	.49531	.03128	.50579	.03205	.51614	.03282	.52636	.03360	30
31	.48488	.03054	.49548	.03130	.50596	.03206	.51631	.03283	.52653	.03361	29
+ 8′	8.48505	.03055	8.49566	.03131	8.50614	.03207	8.51648	.03285	8.52670	.03363	28
33	.48523	.03057	.49584	.03132	.50631	.03209	.51665	.03286	.52687	.03364	27
34	.48541	.03058	.49601	.03133	.50648	.03210	.51682	.03287	.52704	.03365	26
35	.48559	.03059	.49619	.03135	.50666	.03211	.51700	.03288	.52721	.03367	25
+ 9′	8.48576	.03060	8.49636	.03136	8.50683	.03212	8.51717	.03290	8.52738	.03368	24
37	.48594	.03062	.49654	.03137	.50700	.03214	.51734	.03291	.52755	.03369	23
38	.48612	.03063	.49671	.03138	.50718	.03215	.51751	.03292	.52772	.03371	22
39	.48630	.03064	.49689	.03140	.50735	.03216	.51768	.03294	.52789	.03372	21
+ 10′	8.48648	.03065	8.49706	.03141	8.50752	.03218	8.51785	.03295	8.52806	.03373	20
41	.48665	.03067	.49724	.03142	.50770	.03219	.51802	.03296	.52822	.03375	19
42	.48683	.03068	.49742	.03144	.50787	.03220	.51819	.03298	.52839	.03376	18
43	.48701	.03039	.49759	.03145	.50804	.03221	.51836	.03299	.52856	.03377	17
+ 11′	8.48719	.03070	8.49777	.03146	8.50821	.03223	8.51854	.03300	8.52873	.03379	16
45	.48736	.03072	.49794	.03147	.50839	.03224	.51871	.03301	.52890	.03380	15
46	.48754	.03073	.49812	.03149	.50856	.03225	.51888	.03303	.52907	.03381	14
47	.48772	.03074	.49829	.03150	.50873	.03227	.51905	.03304	.52924	.03382	13
+ 12′	8.48789	.03075	8.49847	.03151	8.50891	.03228	8.51922	.03305	8.52941	.03384	12
49	.48807	.03077	.49864	.03152	.50908	.03229	.51939	.03307	.52958	.03385	11
50	.48825	.03078	.49882	.03154	.50925	.03230	.51956	.03308	.52974	.03386	10
51	.48843	.03079	.49899	.03155	.50943	.03232	.51973	.03309	.52991	.03388	9
+ 13′	8.48860	.03080	8.49917	.03156	8.50960	.03233	8.51990	.03311	8.53008	.03389	8
53	.48878	.03082	.49934	.03157	.50977	.03234	.52007	.03312	.53025	.03390	7
54	.48896	.03083	.49952	.03159	.50994	.03236	.52024	.03313	.53042	.03392	6
55	.48914	.03084	.49969	.03160	.51012	.03237	.52041	.03314	.53059	.03393	5
+ 14′	8.48931	.03085	8.49987	.03161	8.51029	.03238	8.52058	.03316	8.53076	.03394	4
57	.48949	.03087	.50004	.03163	.51046	.03239	.52076	.03317	.53092	.03396	3
58	.48967	.03088	.50022	.03164	.51063	.03241	.52093	.03318	.53109	.03397	2
59	.48984	.03089	.50039	.03165	.51081	.03242	.52110	.03320	.53126	.03398	1
+ 15′	8.49002	.03090	8.50056	.03166	8.51098	.03243	8.52127	.03321	8.53143	.03400	0
	$22^{h}\ 39^{m}$		$22^{h}\ 38^{m}$		$22^{h}\ 37^{m}$		$22^{h}\ 36^{m}$		$22^{h}\ 35^{m}$		

TABLE 45.

Haversines.

s	$1^h\ 25^m$ 21° 15′		$1^h\ 26^m$ 21° 30′		$1^h\ 27^m$ 21° 45′		$1^h\ 28^m$ 22° 0′		$1^h\ 29^m$ 22° 15′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	8.53143	**.03400**	8.54147	**.03479**	8.55139	**.03560**	8.56120	**.03641**	8.57089	**.03723**	60
1	.53160	**.03401**	.54164	**.03480**	.55156	**.03561**	.56136	**.03642**	.57105	**.03724**	59
2	.53177	**.03402**	.54180	**.03482**	55172	**.03562**	.56152	**.03644**	.57121	**.03726**	58
3	.53193	**.03404**	.54197	**.03483**	.55189	**.03564**	.56169	**.03645**	.57137	**.03727**	57
+ 1′	8.53210	**.03405**	8.54214	**.03484**	8.55205	**.03565**	8.56185	**.03646**	8.57153	**.03728**	56
5	.53227	**.03406**	.54230	**.03486**	.55221	**.03566**	.56201	**.03648**	.57169	**.03730**	55
6	.53244	**.03408**	.54247	**.03487**	55238	**.03568**	.56217	**.03649**	.57185	**.03731**	54
7	.53261	**.03409**	.54263	**.03488**	.55254	**.03569**	.56233	**.03650**	.57201	**.03733**	53
+ 2′	8.53277	**.03410**	8.54280	**.03490**	8.55271	**.03570**	8.56250	**.03652**	8.57217	**.03734**	52
9	.53294	**.03411**	.54297	**.03491**	.55287	**.03572**	.56266	**.03653**	.57233	**.03735**	51
10	.53311	**.03413**	.54313	**.03492**	.55303	**.03573**	.56282	**.03654**	.57230	**.03737**	50
11	.53328	**.03414**	.54330	**.03494**	.55320	**.03574**	.56298	**.03656**	.57266	**.03738**	49
+ 3′	8.53345	**.03415**	8.54346	**.03495**	8.55336	**.03576**	8.56315	**.03657**	8.57282	**.03740**	48
13	.53361	**.03417**	.54363	**.03496**	.55353	**.03577**	.56331	**.03659**	.57298	**.03741**	47
14	.53378	**.03418**	.54380	**.03498**	.55369	**.03578**	.56347	**.03660**	.57314	**.03742**	46
15	.53395	**.03419**	.54396	**.03499**	.55385	**.03580**	.56363	**.03661**	.57330	**.03744**	45
+ 4′	8.53412	**.03421**	8.54413	**.03500**	8.55402	**.03581**	8.56379	**.03663**	8.57346	**.03745**	44
17	.53429	**.03422**	.54429	**.03502**	.55418	**.03582**	.56396	**.03664**	.57362	**.03746**	43
18	.53445	**.03423**	.54446	**.03503**	.55435	**.03584**	.56412	**.03665**	.57378	**.03748**	42
19	.53462	**.03425**	.54462	**.03504**	.55451	**.03585**	.56428	**.03667**	.57394	**.03749**	41
+ 5′	8.53479	**.03426**	8.54479	**.03506**	8.55467	**.03587**	8.56444	**.03668**	8.57410	**.03751**	40
21	.53496	**.03427**	.54496	**.03507**	.55484	**.03588**	.56460	**.03669**	.57426	**.03752**	39
22	.53512	**.03429**	.54512	**.03509**	.55500	**.03589**	.56477	**.03671**	.57442	**.03753**	38
23	.53529	**.03430**	.54529	**.03510**	.55516	**.03591**	.56493	**.03672**	.57458	**.03755**	37
+ 6′	8.53546	**.03431**	8.54545	**.03511**	8.55533	**.03592**	8.56509	**.03674**	8.57474	**.03756**	36
25	.53563	**.03433**	.54562	**.03513**	.55549	**.03593**	.56525	**.03675**	.57490	**.03757**	35
26	.53580	**.03434**	.54578	**.03514**	.55566	**.03595**	.56541	**.03676**	.57506	**.03759**	34
27	.53596	**.03435**	.54595	**.03515**	.55582	**.03596**	.56557	**.03678**	.57522	**.03760**	33
+ 7′	8.53613	**.03437**	8.54612	**.03517**	8.55598	**.03597**	8.56574	**.03679**	8.57538	**.03762**	32
29	.53630	**.03438**	.54628	**.03518**	.55615	**.03599**	.56590	**.03680**	.57554	**.03763**	31
30	.53646	**.03439**	.54645	**.03519**	.55631	**.03600**	.56606	**.03682**	.57570	**.03764**	30
31	.53663	**.03441**	.54661	**.03521**	.55647	**.03601**	.56622	**.03683**	.57585	**.03766**	29
+ 8′	8.53680	**.03442**	8.54678	**.03522**	8.55664	**.03603**	8.56638	**.03685**	8.57601	**.03767**	28
33	.53697	**.03443**	.54694	**.03523**	.55680	**.03604**	.56654	**.03686**	.57617	**.03769**	27
34	.53713	**.03445**	.54711	**.03525**	.55696	**.03605**	.56670	**.03687**	.57633	**.03770**	26
35	.53730	**.03446**	.54727	**.03526**	.55713	**.03607**	.56687	**.03689**	.57649	**.03771**	25
+ 9′	8.53747	**.03447**	8.54744	**.03527**	8.55729	**.03608**	8.56703	**.03690**	8.57665	**.03773**	24
37	.53764	**.03449**	.54760	**.03529**	.55745	**.03610**	.56719	**.03691**	.57681	**.03774**	23
38	.53780	**.03450**	.54777	**.03530**	.55762	**.03611**	.56735	**.03693**	.57697	**.03775**	22
39	.53797	**.03451**	.54793	**.03531**	.55778	**.03612**	.56751	**.03694**	.57713	**.03777**	21
+ 10′	8.53814	**.03453**	8.54810	**.03533**	8.55794	**.03614**	8.56767	**.03695**	8.57729	**.03778**	20
41	.53830	**.03454**	.54826	**.03534**	.55811	**.03615**	.56783	**.03697**	.57745	**.03780**	19
42	.53847	**.03455**	.54843	**.03535**	.55827	**.03616**	.56799	**.03698**	.57761	**.03781**	18
43	.53864	**.03457**	.54859	**.03537**	.55843	**.03618**	.56816	**.03700**	.57777	**.03782**	17
+ 11′	8.53880	**.03448**	8.54876	**.03538**	8.55859	**.03619**	8.56832	**.03701**	8.57793	**.03784**	16
45	.53897	**.03459**	.54892	**.03539**	.55876	**.03620**	.56848	**.03702**	.57809	**.03785**	15
46	.53914	**.03460**	.54909	**.03541**	.55892	**.03622**	.56864	**.03704**	.57825	**.03787**	14
47	.53930	**.03462**	.54925	**.03542**	.55908	**.03623**	.56880	**.03705**	.57841	**.03788**	13
+ 12′	8.53947	**.03463**	8.54942	**.03543**	8.55925	**.03624**	8.56896	**.03706**	8.57856	**.03789**	12
49	.53964	**.03464**	.54958	**.03545**	55941	**.03626**	.56912	**.03708**	.57872	**.03791**	11
50	.53980	**.03466**	.54975	**.03546**	.55957	**.03627**	56928	**.03709**	.57888	**.03792**	10
51	.53997	**.03467**	.54991	**.03547**	.55973	**.03629**	.56944	**.03711**	.57904	**.03794**	9
+ 13′	8.54014	**.03468**	8.55008	**.03549**	8.55990	**.03630**	8.56960	**.03712**	8.57920	**.03795**	8
53	.54030	**.03470**	.55024	**.03550**	56006	**.03631**	56977	**.03713**	.57936	**.03796**	7
54	.54047	**.03471**	.55041	**.03551**	.56022	**.03633**	.56993	**.03715**	57952	**.03798**	6
55	.45064	**.03472**	.55057	**.03553**	.56039	**.03634**	.57009	**.03716**	.57968	**.03799**	5
+ 14′	8.54080	**.03474**	8.55073	**.03554**	8.56055	**.03635**	8.57025	**.03717**	8.57984	**.03800**	4
57	.54097	**.03475**	.55090	**.03555**	.56071	**.03637**	.57041	**.03719**	.58000	**.03802**	3
58	.54114	**.03476**	.55106	**.03557**	.56087	**.03638**	.57057	**.03720**	.58015	**.03803**	2
59	.54130	**.03478**	.55123	**.03558**	.56104	**.03639**	.57073	**.03722**	.58031	**.03805**	1
+ 15′	8.54147	**.03479**	8.55139	**.03560**	8.56120	**.03641**	8.57089	**.03723**	8.58047	**.03806**	0
	$22^h\ 34^m$		$22^h\ 33^m$		$22^h\ 32^m$		$22^h\ 31^m$		$22^h\ 30^m$		

TABLE 45.

Haversines.

	$1^{h}\ 30^{m}$ 22° 30′		$1^{h}\ 31^{m}$ 22° 45′		$1^{h}\ 32^{m}$ 23° 0′		$1^{h}\ 33^{m}$ 23° 15′		$1^{h}\ 34^{m}$ 23° 30′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	8.58047	.03806	8.58994	.03890	8.59931	.03975	8.60857	.04060	8.61773	.04147	60
1	.58063	.03807	.59010	.03891	.59947	.03976	.60873	.04062	61789	.04148	59
2	.58079	.03809	.59026	.03893	.59962	.03978	.60888	.04063	.61804	.04150	58
3	.58095	.03810	.59042	.03894	.59978	.03979	.60903	.04065	.61819	.04151	57
+ 1′	8.58111	.03812	8.59057	.03896	8.59993	.03980	8.60919	.04066	8.61834	.04153	56
5	.58127	.03813	.59073	.03897	.60009	.03982	.60934	.04068	.61849	.04154	55
6	.58142	.03814	.59089	.03898	.60024	.03983	.60949	.04069	.61864	.04156	54
7	.58158	.03816	.59104	.03900	.60040	.03985	.60965	.04070	.61880	.04157	53
+ 2′	8.58174	.03817	8.59120	.03901	8.60055	.03986	8.60980	.04072	8.61895	.04159	52
9	.58190	.03819	.59136	.03903	.60071	.03988	.60995	.04073	.61910	.04160	51
10	.58206	.03820	.59151	.03904	.60086	.03989	.61011	.04075	.61925	.04162	50
11	.58222	.03821	.59167	.03905	.60102	.03990	.61026	.04076	.61940	.04163	49
+ 3′	8.58238	.03823	8.59183	.03907	8.60117	.03992	8.61041	.04078	8.61955	.04164	48
13	.58253	.03824	.59198	.03908	.60133	.03993	.61057	.04079	.61971	.04166	47
14	.58269	.03826	.59214	.03910	.60148	.03995	.61072	.04081	.61986	.04167	46
15	.58285	.03827	.59230	.03911	.60164	.03996	.61087	.04082	.62001	.04169	45
+ 4′	8.58301	.03828	8.59245	.03912	8.60179	.03998	8.61103	.04083	8.62016	.04170	44
17	.58317	.03830	.59261	.03914	.60195	.03999	.61118	.04085	.62031	.04172	43
18	.58333	.03831	.59277	.03915	.60210	.04000	.61133	.04086	.62046	04173	42
19	.58348	.03833	.59292	.03917	.60226	.04002	.61149	.04088	.62061	.04175	41
+ 5′	8.58364	.03834	8.59308	.03918	8.60241	.04003	8.61164	.04089	8.62077	.04176	40
21	.58380	.03835	.59323	.03920	.60256	.04005	.61179	.04091	.62092	.04177	39
22	.58396	.03837	.59339	.03921	.60272	.04006	.61194	.04092	.62107	.04179	38
23	.58412	.03838	.59355	.03922	.60287	.04007	.61210	.04094	.62122	.04180	37
+ 6′	8.58427	.03839	8.59370	.03924	8.60303	.04009	8.61225	.04095	8.62137	.04182	36
25	.58443	.03841	.59386	.03925	.60318	.04010	.61240	.04096	.62152	.04183	35
26	.58459	.03842	.59402	.03927	.60334	.04012	.61256	.04098	.62167	.04185	34
27	.58475	.03844	.59417	.03928	.60349	.04013	.61271	.04096	.62182	.04186	33
+ 7′	8.58491	.03845	8.59433	.03929	8.60365	.04015	8.61286	.04101	8.62197	.04188	32
29	.58506	.03846	.59448	.03931	.60380	.04016	.61301	.04102	.62213	.04189	31
30	.58522	.03848	.59464	.03932	.60396	.04017	.61317	.04104	.62228	.04191	30
31	.58538	.03849	.59480	.03934	.60411	.04019	.61332	.04105	.62243	.04192	29
+ 8′	8.58554	.03851	8.59495	.03935	8.60426	.04020	8.61347	.04106	8.62258	.04194	28
33	.58570	.03852	.59511	.03936	.60442	.04022	.61362	.04108	.62273	.04195	27
34	.58585	.03853	.59527	.03938	.60457	.04023	.61378	.04109	.62288	.04196	26
35	.58601	.03855	.59542	.03939	.60473	.04025	.61393	.04111	.62303	.04198	25
+ 9′	8.58617	.03856	8.59558	.03941	8.60488	.04026	8.61408	.04112	8.62318	.04199	24
37	.58633	.03858	.59573	.03942	.60504	.04027	.61423	.04114	.62333	.04201	23
38	.58648	.03859	.59589	.03944	.60519	.04029	.61439	.04115	.62348	.04202	22
39	.58664	.03860	.59604	.03945	.60534	.04030	.61454	.04117	.62363	.04204	21
+ 10′	8.58680	.03862	8.59620	.03946	8.60550	.04032	8.61469	.04118	8.62379	.04205	20
41	.58696	.03863	.59636	.03948	.60565	.04033	.61484	.04119	.62394	.04207	19
42	.58711	.03865	.59651	.03949	.60581	.04035	.61500	.04121	.62409	.04208	18
43	.58727	.03866	.59667	.03951	.60596	.04036	.61515	.04122	.62424	.04210	17
+ 11′	8.58743	.03867	8.59682	.03952	8.60611	.04038	8.61530	.04124	8.62439	.04211	16
45	.58759	.03869	.59698	.03953	.60627	.04039	.61545	.04125	.62454	.04212	15
46	.58774	.03870	.59714	.03955	.60642	.04040	.61561	.04127	.62469	.04214	14
47	.58790	.03872	.59729	.03956	.60658	.04042	.61576	.04128	.62484	.04215	13
+ 12′	8.58806	.03873	8.59745	.03958	8.60673	.04043	8.61591	.04130	8.62499	.04217	12
49	.58822	.03875	.59760	.03959	.60688	.04045	.61606	.04131	.62514	.04218	11
50	.58837	.03876	.59776	.03961	.60704	.04040	.61621	.04133	.62529	.04220	10
51	.58853	.03877	.59791	.03962	.60719	.04048	.61637	.04134	.62544	.04221	9
+ 13′	8.58869	.03879	8.59807	.03963	8.60734	.04049	8.61652	.04135	8.62559	.04223	8
53	.58885	.03880	.59822	.03965	.60750	.04050	.61667	.04137	.62574	.04224	7
54	.58900	.03882	.59838	.03966	.60765	.04052	.61682	.04138	.62589	.04226	6
55	.58916	.03883	.59853	.03968	.60781	.04053	.61697	.04140	.62604	.04227	5
+ 14′	8.58932	.03884	5.59869	.03969	8.60796	.04055	8.61713	.04141	8.62619	.04229	4
57	.58947	.03886	.59885	.03971	.60811	.04050	.61728	.04143	.62634	.04230	3
58	.58963	.03887	.59900	.03972	.60827	.04058	.61743	.04144	.62649	.04232	2
59	.58979	.03889	.59916	.03973	.60842	.04059	.61758	.04146	.62664	.04233	1
+ 15′	8.58994	.03890	8.59931	.03975	8.60857	.04060	8.61773	.04147	8.62680	.04234	0
	$22^{h}\ 29^{m}$		$22^{h}\ 28^{m}$		$22^{h}\ 27^{m}$		$22^{h}\ 26^{m}$		$22^{h}\ 25^{m}$		

TABLE 45.

Haversines.

	$1^h\ 35^m$ 23° 45′		$1^h\ 36^m$ 24° 0′		$1^h\ 37^m$ 24° 15′		$1^h\ 38^m$ 24° 30′		$1^h\ 39^m$ 24° 45′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	8.62680	.04234	8.63576	.04323	8.64463	.04412	8.65340	.04502	8.66208	.04593	60
1	.62695	.04236	.63591	.04324	.64477	.04413	.65355	.04503	.66223	.04594	59
2	.62710	.04237	.63606	.04326	.64492	.64415	.65369	.04505	.66237	.04596	58
3	.62725	.04239	.63620	.04327	.64507	.04416	.65384	.04506	.66251	.04597	57
+ 1′	8.62740	.04240	8.63635	.04329	8.64521	.04418	8.65398	.04508	8.66266	.04599	56
5	.62755	.04242	.63650	.04330	.64536	.04419	.65413	.04509	.66280	.04600	55
6	.62770	.04243	.63665	.04332	.64551	.04421	.65427	.04511	.66295	.04602	54
7	.62785	.64245	.63680	.04333	.64565	.04422	.65442	.04512	.66309	.04604	53
+ 2′	8.62800	.04246	8.63695	.04335	8.64580	.04424	8.65456	.04514	8.66323	.04605	52
9	.62815	.04248	.63709	.04336	.64595	.04425	.65471	.04516	.66338	.04607	51
10	.62830	.04249	.63724	.04338	.64609	.04427	.65485	.04517	.66352	.04608	50
11	.62845	.04251	.63739	.04339	.64624	.04428	.65500	.04519	.66366	.04610	49
+ 3′	8.62860	.04252	8.63754	.04340	8.64639	.04430	8.65514	.04520	8.66381	.04611	48
13	.62875	.04253	.63769	.04342	.64653	.04431	.65529	.04522	.66395	.04613	47
14	.62890	.04255	.63784	.04343	.64668	.04433	.65543	.04523	.66409	.04614	46
15	.62904	.04256	.63798	.04345	.64683	.04434	.65558	.04525	.66424	.04616	45
+ 4′	8.62919	.04258	8.63813	.04346	8.64697	.04436	8.65572	.04526	8.66438	.04617	44
17	.62934	.04259	.63828	.04348	.64712	.04437	.65587	.04528	.66453	.04619	43
18	.62949	.04261	.63843	.04349	.64727	.04439	.65601	.04529	.66467	.04620	42
19	.62964	.04262	.63858	.04351	.64741	.04440	.65616	.04531	.66481	.04622	41
+ 5′	8.62979	.04264	8.63872	.04352	8.64756	.04442	8.65630	.04532	8.66496	.04623	40
21	.62994	.04265	.63887	.04354	.64771	.04443	.65645	.04534	.66510	.04625	39
22	.63009	.04267	.63902	.04355	.64785	.04445	.65659	.04535	.66524	.04620	38
23	.63024	.04668	.63917	.04357	.64800	.04440	.65674	.04537	.66539	.04628	37
+ 6′	8.63039	.04270	8.63932	.04358	8.64815	.04448	8.65688	.04538	8.66553	.04629	36
25	.63054	.04271	.63946	.04360	.64829	.04449	.65703	.04540	.66567	.04631	35
26	.63069	.04273	.63961	.04361	.64844	.04451	.65717	.04541	.66582	.04633	34
27	.63084	.04274	.63976	.04363	.64859	.04452	.65732	.04543	.66596	.04634	33
+ 7′	8.63099	.04276	8.63991	.04364	8.64873	.04454	8.65746	.04544	8.66610	.04636	32
29	.63114	.04277	.64006	.04366	.64888	.04455	.65761	.04546	.66625	.04637	31
30	.63129	.04278	.64020	.04367	.64902	.04457	.65775	.04547	.66639	.04639	30
31	.63144	.04280	.64035	.04369	.64917	.04458	.65790	.04549	.66653	.04640	29
+ 8′	8.63159	.04281	8.64050	.04370	8.64932	.04460	8.65804	.04550	8.66668	.04642	28
33	.63174	.04283	.64065	.04372	.64946	.04461	.65819	.04552	.66682	.04643	27
34	.63189	.04284	.64079	.04373	.64961	.04463	.65833	.04553	.66696	.04645	26
35	.63204	.04286	.64094	.04375	.64976	.04464	.65848	.04555	.66710	.04646	25
+ 9′	8.63218	.04287	8.64109	.04376	8.64990	.04460	8.65862	.04556	8.66725	.04648	24
37	.63233	.04289	.64124	.04378	.65005	.04467	.65876	.04558	.66739	.04649	23
38	.63248	.04290	.64139	.04379	.65019	.64469	.65891	.04559	.66753	.04651	22
39	.63263	.04292	.64153	.04381	.65034	.04470	.65905	.04561	.66768	.04652	21
+ 10′	8.63278	.04293	8.64168	.04382	8.65049	.04472	8.65920	.04562	8.66782	.04654	20
41	.63293	.04295	.64183	.04384	.65063	.04473	.65934	.04564	.66796	.04655	19
42	.63308	.04296	.64198	.04385	.65078	.04475	.65949	.04565	.66811	.04657	18
43	.63323	.04298	.64212	.04387	.65092	.04476	.65963	.04567	.66825	.04659	17
+ 11′	8.63338	.04299	8.64227	.04388	8.65107	.04478	8.65978	.04569	8.66839	.04660	16
45	.63353	.04301	.64242	.04390	.65122	.04479	.65992	.04570	.66853	.04662	15
46	.63368	.04302	.64257	.04391	.65136	.04481	.66006	.04572	.66868	.04663	14
47	.63382	.04304	.64271	.04393	.65151	.04482	.66021	.04573	.66882	.04665	13
+ 12′	8.63397	.04305	8.64286	.04394	8.65165	.04484	8.66035	.04575	8.66896	.04666	12
49	.63412	.04366	.64301	.04395	.65180	.04485	.66050	.04576	.66911	.04668	11
50	.63427	.04308	.64315	.04397	.65194	.04487	.66064	.04578	.66925	.04669	10
51	.63442	.04309	.64330	.04398	.65209	.04488	.66079	.04579	.66939	.04671	9
+ 13′	8.63457	.04311	8.64345	.04400	8.65224	.04490	8.66093	.04581	8.66953	.04672	8
53	.63472	.04312	.64360	.04401	.65238	.04491	.66107	.04582	.66968	.04674	7
54	.63487	.04314	.64374	.04403	.65253	.04493	.66122	.04584	.66982	.04675	6
55	.63502	.04315	.64389	.04404	.65267	.04494	.66136	.04585	.66996	.04677	5
+ 14′	8.63516	.04317	8.64404	.04405	8.65282	.04496	8.66151	.04587	8.67010	.04678	4
57	.63531	.04318	.64418	.04407	.65296	.04497	.66165	.04588	.67025	.04680	3
58	.63546	.04320	.64433	.04409	.65311	.04409	.66179	.04590	.67039	.04682	2
59	.63561	.04321	.64448	.04410	.65325	.04500	.66194	.04591	.67053	.04683	1
+ 15′	8.63576	.04323	8.64463	.04412	8.65340	.04502	8.66208	.04593	8.67067	.04685	0
	$22^h\ 24^m$		$22^h\ 23^m$		$22^h\ 22^m$		$22^h\ 21^m$		$22^h\ 20^m$		

TABLE 45.

Haversines.

	$1^h 40^m$ 25° 0′		$1^h 41^m$ 25° 15′		$1^h 42^m$ 25° 30′		$1^h 43^m$ 25° 45′		$1^h 44^m$ 26° 0′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	8.67067	.04685	8.67918	.04777	8.68760	.04871	8.69593	.04965	8.70418	.05060	60
1	.67082	.04686	.67932	.04779	.68773	.04872	.69607	.04967	.70431	.05062	59
2	.67096	.04688	.67946	.04780	.68787	.04874	.69620	.04968	.70445	.05063	58
3	.67110	.04689	.67960	.04782	.68801	.04875	.69634	.04970	.70459	.05065	57
+ 1′	8.67124	.04691	8.67974	.04783	8.68815	.04877	8.69648	.04971	8.70472	.05067	56
5	.67139	.04692	.67988	.04785	.68829	.04879	.69662	.04973	.70486	.05068	55
6	.67153	.04094	.68002	.04787	.68843	.04880	.69676	.04975	.70500	.05070	54
7	.67167	.04695	.68016	.04788	.68857	.04882	.69690	.04976	.70513	.05071	53
+ 2′	8.67181	.04697	8.68030	.04790	8.68871	.04883	8.69703	.04978	8.70527	.05073	52
9	.67196	.04698	.68045	.04791	.68885	.04885	.69717	.04979	.70541	.05075	51
10	.67210	.04700	.68059	.04793	.68899	.04880	.69731	.04981	.70554	.05076	50
11	.67224	.04702	.68073	.04794	.68913	.04888	.69745	.04982	.70568	.05078	49
+ 3′	8.67238	.04703	8.68087	.04796	8.68927	.04890	8.69758	.04984	8.70582	.05079	48
13	.67252	.04705	.68101	.04797	.68941	.04891	.69772	.04986	.70595	.05081	47
14	.67267	.04706	.68115	.04799	.68955	.04893	.69786	.04987	.70609	.05083	46
15	.67281	.04708	.68129	.04801	.68969	.04894	.69800	.64989	.70623	.05084	45
+ 4′	8.67295	.04709	8.68143	.04802	8.68983	.04896	8.69814	.04990	8.70636	.05086	44
17	.67309	.04711	.68157	.04804	.68996	.04897	.69827	.04992	.70650	.05087	43
18	.67323	.04712	.68171	.04805	.69010	.04899	.69841	.04994	.70664	.05089	42
19	.67338	.04714	.68185	.04807	.69024	.04901	.69855	.04995	.70677	.05091	41
+ 5′	8.67352	.04715	8.68199	.04808	8.69038	.04902	8.69869	.04997	8.70691	.05092	40
21	.67366	.04717	.68213	.04810	.69052	.04904	.69882	.04998	.70704	.05094	39
22	.67380	.04718	.68227	.04811	.69066	.04905	.69896	.05000	.70718	.05095	38
23	.67394	.04720	.68241	.04813	.69080	.04907	.69910	.05001	.70732	.05097	37
+ 6′	8.67409	.04722	8.68256	.04815	8.69094	.04908	8.69924	.05003	8.70745	.05099	36
25	.67423	.04723	.68270	.04816	.69108	.04910	.69937	.05095	.70759	.05100	35
26	.67437	.04725	.68284	.04818	.69122	.04912	.69951	.05000	.70773	.05102	34
27	.67451	.04726	.68298	.04819	.69136	.04913	.69965	.05008	.70786	.05104	33
+ 7′	8.67465	.04728	8.68312	.04821	8.69149	.04915	8.69979	.05009	8.70800	.05105	32
29	.67480	.04729	.68326	.04822	.69163	.04916	.69992	.05011	.70813	.05107	31
30	.67494	.04731	.68340	.04824	.69177	.04918	.70006	.05013	.70827	.05108	30
31	.67508	.04732	.68354	.04825	.69191	.04919	.70020	.05014	.70841	.05110	29
+ 8′	8.67522	.04734	8.68368	.04827	8.69205	.04921	8.70034	.05016	8.70854	.05111	28
33	.67536	.04735	.68382	.04829	.69219	.04923	.70047	.05017	.70868	.05113	27
34	.67550	.04737	.68396	.04830	.69233	.04924	.70061	.05019	.70881	.05115	26
35	.67565	.04739	.68410	.04832	.69247	.04926	.70075	.05021	.70895	.05116	25
+ 9′	8.67579	.04740	8.68424	.04833	8.69260	.04927	8.70089	.05022	8.70909	.05118	24
37	.67593	.04742	.68438	.04835	.69274	.04929	.70102	.05024	.70922	.05119	23
38	.67607	.04743	.68452	.04836	.69288	.04930	.70116	.05025	.70936	.05121	22
39	.67621	.04745	.68466	.04838	.69302	.04932	.70130	.05027	.70949	.05123	21
+ 10′	8.67635	.04746	8.68480	.04839	8.69316	.04934	8.70144	.05028	8.70963	.05124	20
41	.67649	.04748	.68494	.04841	.69330	.04935	.70157	.05030	.70977	.05126	19
42	.67664	.04749	.68508	.04843	.69344	.04937	.70171	.05032	.70990	1 .05127	18
43	.67678	.04751	.68522	.04844	.69358	.04938	.70185	.05033	.71004	.05129	17
+ 11′	8.67692	.04752	8.68536	.04846	8.69371	.04940	8.70198	.05035	8.71017	.05131	16
45	.67706	.04754	.68550	.04847	.69385	.04941	.70212	.05036	.71031	.05132	15
46	.67720	.64756	.68564	.04849	.69399	.04943	.70226	.05038	.71045	.05134	14
47	.67734	.04757	.68578	.04850	.69413	.04945	.70240	.05040	.71058	.05135	13
+ 12′	8.67748	.04759	8.68592	.04852	8.69427	.04946	8.70253	.05041	8.71072	.05137	12
49	.67763	.04760	.68606	.04854	.69441	.04948	.70267	.05043	.71085	.05139	11
50	.67777	.04762	.68620	.04855	.69454	.04949	.70281	.05044	.71099	.05140	10
51	.67791	.04763	.68634	.04857	.69468	.04951	.70294	.05046	.71112	.05142	9
+ 13′	8.67805	.04765	8.68648	.04858	8.69482	.04952	8.70308	.05048	8.71126	.05144	8
53	.67819	.04766	.68662	.04860	.69496	.64954	.70322	.05049	.71140	.05145	7
54	.67833	.04768	.68676	.04801	.69510	.04956	.70336	.05051	.71153	.05147	6
55	.67847	.04769	.68690	.04863	.69524	.04957	.70349	.05052	.71167	.05148	5
+ 14′	8.67861	.04771	8.68704	.04864	8.69537	.04959	8.70363	.05054	8.71180	.05150	4
57	.67875	.04773	.68718	.04860	.69551	.04960	.70377	.05055	.71194	.05152	3
58	.67890	.04774	.68732	.04868	.69565	.04962	.70390	.05057	.71207	.05153	2
59	.67904	.04776	.68746	.04869	.69579	.04964	.70404	.05059	.71221	.05155	1
+ 15′	8.67918	.04777	8.68760	.04871	8.69593	.04965	8.70418	.05060	8.71234	.05156	0
	$22^h 19^m$		$22^h 18^m$		$22^h 17^m$		$22^h 16^m$		$22^h 15^m$		

TABLE 45.

Haversines.

	$1^h\,55^m$ 28° 45′		$1^h\,56^m$ 29° 0′		$1^h\,57^m$ 29° 15′		$1^h\,58^m$ 29° 30′		$1^h\,59^m$ 29° 45′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	8.78984	.06164	8.79720	.06269	8.80449	.06375	8.81172	.06482	8.81889	.06590	60
1	.78996	.06165	.79732	.06271	.80462	.06377	.81184	.06484	.81901	.06592	59
2	.79009	.06167	.79744	.06273	.80474	.06379	.81196	.06486	.81913	.06594	58
3	.79021	.06169	.79757	.06274	.80486	.06381	.81208	.06488	.81925	.06595	57
+ 1′	8.79033	.06171	8.79769	.06276	8.80498	.06382	8.81220	.06489	8.81937	.06597	56
5	.79046	.06172	.79781	.06278	.80510	.06384	.81232	.06491	.81948	.06599	55
6	.79058	.06174	.79793	.06280	.80522	.06386	.81244	.06493	.81960	.06601	54
7	.79070	.06176	.79805	.06281	.80534	.06388	.81256	.06495	.81972	.06603	53
+ 2′	8.79082	.06178	8.79818	.06283	8.80546	.06389	8.81268	.06497	8.81984	.06605	52
9	.79095	.06179	.79830	.06285	.80558	.06391	.81280	.06498	.81996	.06606	51
10	.79107	.06181	.79842	.06287	.80570	.06393	.81292	.06500	.82008	.06608	50
11	.79119	.06183	.79854	.06288	.80582	.06395	.81304	.06502	.82020	.06610	49
+ 3′	8.79132	.06185	8.79866	.06290	8.80595	.06397	8.81316	.06504	8.82032	.06612	48
13	.79144	.06186	.79879	.06292	.80607	.06398	.81328	.06505	.82043	.06614	47
14	.79156	.06188	.79891	.06294	.80619	.06400	.81340	.06507	.82055	.06615	46
15	.79169	.06190	.79903	.06295	.80631	.06402	.81352	.06509	.82067	.06617	45
+ 4′	8.79181	.06192	8.79915	.06297	8.80643	.06404	8.81364	.06511	8.82079	.06619	44
17	.79193	.06193	.79927	.06299	.80655	.06405	.81376	.06513	.82091	.06621	43
18	.79205	.06195	.79940	.06301	.80667	.06407	.81388	.06514	.82103	.06623	42
19	.79218	.06197	.79952	.06303	.80679	.06409	.81400	.06516	.82115	.06624	41
+ 5′	8.79230	.06199	8.79964	.06304	8.80691	.06411	8.81412	.06518	8.82126	.06626	40
21	.79242	.06200	.79976	.06306	.80703	.06413	.81424	.06520	.82138	.06628	39
22	.79255	.06202	.79988	.06308	.80715	.06414	.81436	.06522	.82150	.06630	38
23	.79267	.06204	.80000	.06310	.80727	.06416	.81448	.06523	.82162	.06632	37
+ 6′	8.79279	.06206	8.80013	.06311	8.80739	.06418	8.81460	.06525	8.82174	.06633	36
25	.79291	.06207	.80025	.06313	.80751	.06420	.81472	.06527	.82186	.06635	35
26	.79304	.06209	.80037	.06315	.80764	.06421	.81484	.06529	.82198	.06637	34
27	.79316	.06211	.80049	.06317	.80776	.06423	.81496	.06531	.82209	.06639	33
+ 7′	8.79328	.06213	8.80061	.06318	8.80788	.06425	8.81508	.06532	8.82221	.06641	32
29	.79341	.06214	.80073	.06320	.80800	.06427	.81520	.06534	.82233	.06642	31
30	.79353	.06216	.80086	.06322	.80812	.06429	.81531	.06536	.82245	.06644	30
31	.79365	.06218	.80098	.06324	.80824	.06430	.81543	.06538	.82257	.06646	29
+ 8′	8.79377	.06220	8.80110	.06326	8.80836	.06432	8.81555	.06540	8.82269	.06648	28
33	.79390	.06221	.80122	.06327	.80848	.06434	.81567	.06541	.82280	.06650	27
34	.79402	.06223	.80134	.06329	.80860	.06436	.81579	.06543	.82292	.06652	26
35	.79414	.06225	.80146	.06331	.80872	.06438	.81591	.06545	.82304	.06653	25
+ 9′	8.79426	.06227	8.80158	.06333	8.80884	.06439	8.81603	.06547	8.82316	.06655	24
37	.79439	.06229	.80171	.06334	.80896	.06441	.81615	.06549	.82328	.06657	23
38	.79451	.06230	.80183	.06336	.80908	.06443	.81627	.06550	.82340	.06659	22
39	.79463	.06232	.80195	.06338	.80920	.06445	.81639	.06552	.82351	.06661	21
+ 10′	8.79475	.06234	8.80207	.06340	8.80932	.06446	8.81651	.06554	8.82363	.06662	20
41	.79488	.06236	.80219	.06341	.80944	.06448	.81663	.06556	.82375	.06664	19
42	.79500	.06237	.80231	.06343	.80956	.06450	.81675	.06558	.82387	.06666	18
43	.79512	.06239	.80243	.06345	.80968	.06452	.81687	.06559	.82399	.06668	17
+ 11′	8.79524	.06241	8.80256	.06347	8.80980	.06454	8.81699	.06561	8.82410	.06670	16
45	.79537	.06243	.80268	.06349	.80992	.06455	.81710	.06563	.82422	.06671	15
46	.79549	.06244	.80480	.06350	.81004	.06457	.81722	.06565	.82434	.06673	14
47	.79561	.06246	.80292	.06352	.81016	.06459	.81734	.06567	.82446	.06675	13
+ 12′	8.79573	.06248	8.80304	.06354	8.81028	.06461	8.81746	.06568	8.82458	.06677	12
49	.79586	.06250	.80316	.06356	.81040	.06463	.81758	.06570	.82470	.06679	11
50	.79598	.06251	.80328	.06357	.81052	.06464	.81770	.06572	.82481	.06681	10
51	.79610	.06253	.80340	.06359	.81064	.06466	.81782	.06574	.82493	.06682	9
+ 13′	8.79622	.06255	8.80353	.06361	8.81076	.06468	8.81794	.06576	8.82505	.06684	8
53	.79634	.06257	.80365	.06363	.81088	.06470	.81806	.06577	.82517	.06686	7
54	.79647	.06258	.80377	.06365	.81100	.06471	.81818	.06579	.82529	.06688	6
55	.79659	.06260	.80389	.06366	.81112	.06473	.81830	.06581	.82540	.06690	5
+ 14′	8.79671	.06262	8.80401	.06368	8.81124	.06475	8.81841	.06583	8.82552	.06691	4
57	.79683	.06264	.80413	.06370	.81136	.06477	.81853	.06585	.82564	.06693	3
58	.79696	.06265	.80425	.06372	.81148	.06479	.81865	.06586	.82576	.06695	2
59	.79708	.06267	.80437	.06373	.81160	.06480	.81877	.06588	.82588	.06697	1
+ 15′	8.79720	.06269	8.80449	.06375	8.81172	.06482	8.81889	.06590	8.82599	.06699	0
	$22^h\,4^m$		$22^h\,3^m$		$22^h\,2^m$		$22^h\,1^m$		$22^h\,0^m$		

TABLE 45.

Haversines.

	$2^h\ 0^m$ 30° 0′		$2^h\ 1^m$ 30° 15′		$2^h\ 2^m$ 30° 30′		$2^h\ 3^m$ 30° 45′		$2^h\ 4^m$ 31° 0′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	8.82599	**.06699**	8.83303	**.06808**	8.84002	**.06919**	8.84694	**.07030**	8.85380	**.07142**	60
1	.82611	**.06701**	.83315	**.06810**	.84013	**.06920**	.84705	**.07032**	.85391	**.07144**	59
2	.82623	**.06702**	.83327	**.06812**	.84025	**.06922**	.84717	**.07033**	.85403	**.07145**	58
3	.82635	**.06704**	.83338	**.06814**	.84036	**.06924**	.84728	**.07035**	.85414	**.07147**	57
+ 1′	8.82646	**.06706**	8.83350	**.06816**	8.84048	**.06926**	8.84740	**.07037**	8.85425	**.07149**	56
5	.82658	**.06708**	.83362	**.06817**	.84059	**.06928**	.84751	**.07039**	.85437	**.07151**	55
6	.82670	**.06710**	.83374	**.06819**	.84071	**.06930**	.84762	**.07041**	.85448	**.07153**	54
7	.82682	**.06711**	.83385	**.06821**	.84083	**.06931**	.84774	**.07043**	.85459	**.07155**	53
+ 2′	8.82694	**.06713**	8.83397	**.06823**	8.84094	**.06933**	8.84785	**.07045**	8.85471	**.07157**	52
9	.82705	**.06715**	.83409	**.06825**	.84106	**.06935**	.84797	**.07046**	.85482	**.07158**	51
10	.82717	**.06717**	.83420	**.06826**	.84117	**.06937**	.84808	**.07048**	.85494	**.07160**	50
11	.82729	**.06719**	.83432	**.06828**	.84129	**.06939**	.84820	**.07050**	.85505	**.07162**	49
+ 3′	8.82741	**.06721**	8.83444	**.06830**	8.84140	**.06941**	8.84831	**.07952**	8.85516	**.07164**	48
13	.82752	**.07722**	.83455	**.06832**	.84152	**.06943**	.84843	**.07054**	.85528	**.07166**	47
14	.82764	**.06724**	.83467	**.06834**	.84164	**.06944**	.84854	**.07056**	.85539	**.07168**	46
15	.82776	**.06726**	.83479	**.06836**	.84175	**.06946**	.84866	**.07058**	.85550	**.07170**	45
+ 4′	8.82788	**.06728**	8.83490	**.06838**	8.84187	**.06948**	8.84877	**.07059**	8.85562	**.07172**	44
17	.82799	**.06730**	.83502	**.06839**	.84198	**.06950**	.84889	**.07061**	.85573	**.07173**	43
18	.82811	**.06731**	.83513	**.06841**	.84210	**.06952**	.84900	**.07063**	.85585	**.07175**	42
19	.82823	**.06733**	.83525	**.06843**	.84221	**.06954**	.84912	**.07065**	.85596	**.07177**	41
+ 5′	8.82835	**.06735**	8.83537	**.06845**	8.84233	**.06956**	8.84923	**.07067**	8.85607	**.07179**	40
21	.82846	**.06737**	.83548	**.06847**	.84244	**.06957**	.84934	**.07069**	.85619	**.07181**	39
22	.82858	**.06739**	.83560	**.06849**	.84356	**.06959**	.84946	**.07071**	.85630	**.07183**	38
23	.82870	**.06741**	.83572	**.06850**	.84268	**.06961**	.84957	**.07073**	.85641	**.07185**	37
+ 6′	8.82882	**.06742**	8.83583	**.06852**	8.84279	**.06963**	8.84969	**.07074**	8.85653	**.07187**	36
25	.82893	**.06744**	.83595	**.06854**	.84291	**.06965**	.84980	**.07076**	.85664	**.07189**	35
26	.82905	**.06746**	.83607	**.06856**	.84302	**.06967**	.84992	**.07078**	.85675	**.07190**	34
27	.82917	**.06748**	.83618	**.06858**	.84314	**.06968**	.85003	**.07080**	.85687	**.07192**	33
+ 7′	8.82929	**.06750**	8.83630	**.06860**	8.84325	**.06970**	8.85015	**.07082**	8.85698	**.07194**	32
29	.82940	**.06752**	.83642	**.06861**	.84337	**.06972**	.85026	**.07084**	.85709	**.07196**	31
30	.82952	**.06753**	.83653	**.06863**	.84348	**.06974**	.85037	**.07086**	.85721	**.07198**	30
31	.82964	**.06755**	.83665	**.06865**	.84360	**.06976**	.85049	**.07087**	.85732	**.07200**	29
+ 8′	8.82976	**.06757**	8.83676	**.06867**	8.84371	**.06978**	8.85060	**.07089**	8.85743	**.07202**	28
33	.82987	**.06759**	.83688	**.06869**	.84383	**.06980**	.85072	**.07091**	.85755	**.07204**	27
24	.82999	**.06761**	.83700	**.06871**	.84394	**.06981**	.85083	**.07093**	.85766	**.07205**	26
35	.83011	**.06763**	.83711	**.06872**	.84406	**.06983**	.85095	**.07095**	.85777	**.07207**	25
+ 9′	8.83023	**.06764**	8.83723	**.06874**	8.84417	**.06985**	8.85106	**.07097**	8.85789	**.07209**	24
37	.83034	**.06766**	.83735	**.06876**	.84429	**.06987**	.85117	**.07099**	.85800	**.07211**	23
38	.83046	**.06788**	.83746	**.06878**	.84441	**.06989**	.85129	**.07100**	.85811	**.07213**	22
39	.82058	**.06770**	.83758	**.06880**	.84452	**.06991**	.85140	**.07102**	.85823	**.07215**	21
+ 10′	8.83069	**.06772**	8.83769	**.06882**	8.84464	**.06993**	8.85152	**.07104**	8.85834	**.07217**	20
41	.83081	**.06773**	.83781	**.06884**	.84475	**.06994**	.85163	**.07106**	.85845	**.07219**	19
42	.83093	**.06775**	.83793	**.06885**	.84487	**.06996**	.85175	**.07108**	.85857	**.07220**	18
43	.83105	**.06777**	.83804	**.06887**	.84498	**.06998**	.85186	**.07110**	.85868	**.07222**	17
+ 11′	8.83116	**.06779**	8.83816	**.06889**	8.84510	**.07000**	8.85197	**.07112**	8.85879	**.07224**	16
45	.83128	**.06781**	.83828	**.06891**	.84521	**.07002**	.85209	**.07114**	.85891	**.07226**	15
46	.83140	**.06783**	.83839	**.06893**	.84533	**.07004**	.85220	**.07115**	.85902	**.07228**	14
47	.83151	**.06784**	.83851	**.06895**	.84544	**.07006**	.85232	**.07117**	.85913	**.07230**	13
+ 12′	8.83163	**.06786**	8.83862	**.06896**	8.84556	**.07007**	8.85243	**.07119**	8.85925	**.07232**	12
49	.83175	**.06788**	.83874	**.06898**	.84567	**.07009**	.85254	**.07121**	.85936	**.07234**	11
50	.83187	**.06790**	.83886	**.06900**	.84579	**.07011**	.85266	**.07123**	.85947	**.07236**	10
51	.83198	**.06792**	.83897	**.06902**	.84590	**.07013**	.85277	**.07125**	.85959	**.07237**	9
+ 13′	8.83210	**.06794**	8.83909	**.06904**	8.84602	**.07015**	8.85289	**.07127**	8.85970	**.07239**	8
53	.83222	**.06795**	.83920	**.06906**	.84613	**.07017**	.85300	**.07129**	.85981	**.07241**	7
54	.83233	**.06797**	.83932	**.06907**	.84625	**.07019**	.85311	**.07130**	.85992	**.07243**	6
55	.83245	**.06799**	.83944	**.06909**	.84636	**.07020**	.85323	**.07132**	.86004	**.07245**	5
+ 14′	8.83257	**.06801**	8.83955	**.06911**	8.84648	**.07022**	8.85334	**.07134**	8.86015	**.07247**	4
57	.83268	**.06803**	.83967	**.06913**	.84659	**.07024**	.85346	**.07136**	.86026	**.07249**	3
58	.83280	**.06805**	.83978	**.06915**	.84671	**.07026**	.85357	**.07138**	.86038	**.07251**	2
59	.83292	**.06806**	.83990	**.06917**	.84682	**.07028**	.85368	**.07140**	.86049	**.07253**	1
+ 15′	8.83303	**.06808**	8.84002	**.06919**	8.84694	**.07030**	8.85380	**.07142**	8.86060	**.07254**	0
	$21^h\ 59^m$		$21^h\ 58^m$		$21^h\ 57^m$		$21^h\ 56^m$		$21^h\ 55^m$		

TABLE 45.

Haversines.

	$2^h\ 5^m$ 31° 15′		$2^h\ 6^m$ 31° 30′		$2^h\ 7^m$ 31° 45′		$2^h\ 8^m$ 32° 0′		$2^h\ 9^m$ 32° 15′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	8.86060	**.07254**	8.86735	**.07368**	8.87404	**.07482**	8.88068	**.07598**	8.88726	**.07714**	60
1	.86072	**.07256**	.86746	**.07370**	.87415	**.07484**	.88079	**.07600**	.88737	**.07716**	59
2	.86085	**.07258**	.86757	**.07372**	.87426	**.07486**	.88090	**.07601**	.88748	**.07717**	58
3	.86094	**.07260**	.86769	**.07374**	.87437	**.07488**	.88101	**.07603**	.88759	**.07719**	57
+ 1′	8.86105	**.07262**	8.86780	**.07376**	8.87448	**.07490**	8.88112	**.07605**	8.88769	**.07721**	56
5	.86117	**.07264**	.86791	**.07377**	.87460	**.07492**	.88123	**.07607**	.88780	**.07723**	55
6	.86128	**.07266**	.86802	**.07379**	.87471	**.07494**	.88134	**.07609**	.88791	**.07725**	54
7	.86139	**.07268**	.86813	**.07381**	.87482	**.07496**	.88145	**.07611**	.88802	**.07727**	53
+ 2′	8.86151	**.07270**	8.86825	**.07383**	8.87493	**.07498**	8.88156	**.07613**	8.88813	**.07729**	52
9	.86162	**.07271**	.86836	**.07385**	.87504	**.07500**	.88167	**.07615**	.88824	**.07731**	51
10	.86173	**.07273**	.86847	**.07387**	.87515	**.07502**	.88178	**.07617**	.88835	**.07733**	50
11	.86184	**.07275**	.86858	**.07389**	.87526	**.07503**	.88189	**.07619**	.88846	**.07735**	49
+ 3′	8.86196	**.07277**	8.86869	**.07391**	8.87537	**.07505**	8.88200	**.07621**	8.88857	**.07737**	48
13	.86207	**.07279**	.86880	**.07393**	.87548	**.07507**	.88211	**.07623**	.88868	**.07739**	47
14	.86218	**.07281**	.86892	**.07395**	.87559	**.07509**	.88222	**.07625**	.88879	**.07741**	46
15	.86229	**.07283**	.86903	**.07397**	.87570	**.07511**	.88233	**.07627**	.88890	**.07743**	45
+ 4′	8.86241	**.07285**	8.86914	**.07398**	8.87582	**.07513**	8.88244	**.07628**	8.88900	**.07745**	44
17	.86252	**.07287**	.86925	**.07400**	.87593	**.07515**	.88255	**.07630**	.88911	**.07747**	43
18	.86263	**.07288**	.86936	**.07402**	.87604	**.07517**	.88266	**.07632**	.88922	**.07749**	42
19	.86275	**.07290**	.86947	**.07404**	.87615	**.07519**	.88277	**.07634**	.88933	**.07751**	41
+ 5′	8.86286	**.07292**	8.86959	**.07406**	8.87626	**.07521**	8.88288	**.07636**	8.88944	**.07752**	40
21	.86297	**.07294**	.86970	**.07408**	.87637	**.07523**	.88299	**.07638**	.88955	**.07754**	39
22	.86308	**.07296**	.86981	**.07410**	.87648	**.07525**	.88310	**.07640**	.88966	**.07756**	38
23	.86320	**.07298**	.86992	**.07412**	.87659	**.07527**	.88321	**.07642**	.88977	**.07758**	37
+ 6′	8.86331	**.07300**	8.87003	**.07414**	8.87670	**.07528**	8.88332	**.07644**	8.88988	**.07760**	36
25	.86342	**.07302**	.87014	**.07416**	.87681	**.07530**	.88343	**.07640**	.88998	**.07762**	35
26	.86353	**.07304**	.87026	**.07417**	.87692	**.07532**	.88354	**.07648**	.89009	**.07764**	34
27	.86365	**.07305**	.87037	**.07419**	.87703	**.07534**	.88364	**.07650**	.89020	**.07766**	33
+ 7′	8.86376	**.07307**	8.87048	**.07421**	8.87714	**.07536**	8.88375	**.07652**	8.89031	**.07768**	32
29	.86387	**.07309**	.87059	**.07423**	.87725	**.07538**	.88386	**.07654**	.89042	**.07770**	31
30	.86398	**.07311**	.87070	**.07425**	.87737	**.07540**	.88397	**.07656**	.89053	**.07772**	30
31	.86410	**.07323**	.87081	**.07427**	.87748	**.07542**	.88408	**.07657**	.89064	**.07774**	29
+ 8′	8.86421	**.07315**	8.87093	**.07429**	8.87759	**.07544**	8.88419	**.07659**	8.89075	**.07776**	28
33	.86432	**.07317**	.87104	**.07431**	.87770	**.07546**	.88430	**.07661**	.89086	**.07778**	27
34	.86443	**.07319**	.87115	**.07433**	.87781	**.07548**	.88441	**.07663**	.89096	**.07780**	26
35	.86455	**.07321**	.87126	**.07435**	.87792	**.07549**	.88452	**.07665**	.89107	**.07782**	25
+ 9′	8.86466	**.07322**	8.87137	**.07437**	8.87803	**.07551**	8.88463	**.07667**	8.89118	**.07784**	24
37	.86477	**.07324**	.87148	**.07438**	.87814	**.07553**	.88474	**.07669**	.89129	**.07786**	23
38	.86488	**.07326**	.87159	**.07440**	.87825	**.07555**	.88485	**.07671**	.89140	**.07788**	22
39	.86499	**.07328**	.87171	**.07442**	.87836	**.07557**	.88496	**.07673**	.89151	**.07789**	21
+ 10′	8.86511	**.07330**	8.87182	**.07444**	8.87847	**.07559**	8.88507	**.07675**	8.89162	**.07791**	20
41	.86522	**.07332**	.87193	**.07440**	.87858	**.07561**	.88518	**.07677**	.89172	**.07793**	19
42	.86533	**.07334**	.87204	**.07448**	.87869	**.07563**	.88529	**.07679**	.89183	**.07795**	18
43	.86544	**.07336**	.87215	**.07450**	.87880	**.07565**	.88540	**.07681**	.89194	**.07797**	17
+ 11′	8.86556	**.07338**	8.87226	**.07452**	8.87891	**.07567**	8.88551	**.07683**	8.89205	**.07799**	16
45	.86567	**.07340**	.87237	**.07454**	.87902	**.07569**	.88562	**.07685**	.89216	**.07801**	15
46	.86578	**.07341**	.87248	**.07456**	.87913	**.07571**	.88573	**.07686**	.89227	**.07803**	14
47	.86589	**.07343**	.87260	**.07458**	.87924	**.07573**	.88584	**.07688**	.89238	**.07805**	13
+ 12′	8.86600	**.07345**	8.87271	**.07459**	8.87935	**.07574**	8.88595	**.07690**	8.89248	**.07807**	12
49	.86611	**.07347**	.87282	**.07461**	.87946	**.07576**	.88606	**.07692**	.89259	**.07809**	11
50	.86623	**.07349**	.87293	**.07463**	.87957	**.07578**	.88616	**.07694**	.89270	**.07811**	10
51	.86634	**.07351**	.87304	**.07465**	.87968	**.07580**	.88627	**.07696**	.89281	**.07813**	9
+ 13′	8.86645	**.07353**	8.87315	**.07467**	8.87980	**.07582**	8.88638	**.07698**	8.89292	**.07815**	8
53	.86657	**.07355**	.87326	**.07469**	.87991	**.07584**	.88649	**.07700**	.89303	**.07817**	7
54	.86668	**.07357**	.87337	**.07471**	.88002	**.07586**	.88660	**.07702**	.89314	**.07819**	6
55	.86679	**.07359**	.87349	**.07473**	.88013	**.07588**	.88671	**.07704**	.89324	**.07821**	5
+ 14′	8.86690	**.07360**	8.87360	**.07475**	8.88024	**.07590**	8.88682	**.07706**	8.89335	**.07823**	4
57	.86701	**.07362**	.87371	**.07477**	.88035	**.07592**	.88693	**.07708**	.89346	**.07825**	3
58	.86713	**.07364**	.87382	**.07479**	.88046	**.07594**	.88704	**.07710**	.89357	**.07827**	2
59	.86724	**.07366**	.87393	**.07480**	.88057	**.07590**	.88715	**.07712**	.89368	**.07829**	1
+ 15′	8.86735	**.07368**	8.87404	**.07482**	8.88068	**.07598**	8.88726	**.07714**	8.89379	**.07830**	0
	$21^h\ 54^m$		$21^h\ 53^m$		$21^h\ 52^m$		$21^h\ 51^m$		$21^h\ 50^m$		

TABLE 45.

Haversines.

	2h 10m 32° 30′		*2h 11m* 32° 45′		*2h 12m* 33° 0′		*2h 13m* 33′ 15′		*2h 14m* 33° 30′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	8.89379	.07830	8.90026	.07948	8.90668	.08066	8.91306	.08186	8.91938	.08306	60
1	.89389	.07832	.90037	.07950	.90679	.08068	.91316	.08188	.91948	.08308	59
2	.89400	.07834	.90048	.07952	.90690	.08070	.91327	.08190	.91959	.08310	58
3	.89411	.07836	.90058	.07954	.90700	.08072	.91337	.08192	.91969	.08312	57
+ 1′	8.89422	.07838	8.90069	.07956	8.90711	.08074	8.91348	.08194	8.91980	.08314	56
5	.89433	.07840	.90080	.07958	.90722	.08076	.91358	.08196	.91990	.08316	55
6	.89444	.07842	.90091	.07960	.90732	.08078	.91369	.08198	.92001	.08318	54
7	.89454	.07844	.90101	.07962	.90743	.08080	.91380	.08200	.92011	.08320	53
+ 2′	8.89465	.07846	8.90112	.07964	8.90754	.08082	8.91390	.08202	8.92022	.08322	52
9	.89476	.07848	.90123	.07966	.90764	.08084	.91401	.08204	.92032	.08324	51
10	.89487	.07850	.90134	.07968	.90775	.08086	.91411	.08206	.92043	.08326	50
11	.89498	.07852	.90144	.07970	.90786	.08088	.91422	.08208	.92053	.08328	49
+ 3′	8.89509	.07854	8.90155	.07972	8.90796	.08090	8.91432	.08210	8.92064	.08330	48
13	.89519	.07856	.90166	.07974	.90807	.08092	.91443	.08212	.92074	.08332	47
14	.89530	.07858	.90176	.07976	.90818	.08094	.91454	.08214	.92084	.08334	46
15	.89541	.07860	.90187	.07978	.90828	.08096	.91464	.08216	.92095	.08336	45
+ 4′	8.89552	.07862	8.90198	.07980	8.90839	.08098	8.91475	.08218	8.92105	.08338	44
17	.89563	.07864	.90209	.07982	.90849	.08100	.91485	.08220	.92116	.08340	43
18	.89573	.07866	.90219	.07983	.90860	.08102	.91496	.08222	.92126	.08342	42
19	.89584	.07868	.90230	.07985	.90871	.08104	.91506	.08224	.92137	.08344	41
+ 5′	8.89595	.07870	8.90241	.07987	8.90881	.08106	8.91517	.08226	8.92147	.08346	40
21	.89606	.07872	.90252	.07989	.90892	.08108	.91527	.08228	.92158	.08348	39
22	.89617	.07873	.90262	.07991	.90903	.08110	.91538	.08230	.92168	.08350	38
23	.89627	.07875	.90273	.07993	.90913	.08112	.91549	.08232	.92179	.08352	37
+ 6′	8.89638	.07877	8.90284	.07995	8.90924	.08114	8.91559	.08234	8.92189	.08354	36
25	.89649	.07879	.90294	.07997	.90935	.08116	.91570	.08236	.92200	.08356	35
26	.89660	.07881	.90305	.07999	.90945	.08118	.91580	.08238	.92210	.08358	34
27	.89671	.07883	.90316	.08001	.90956	.08120	.91591	.08240	.92221	.08360	33
+ 7′	8.89681	.07885	8.90326	.08003	8.90966	.08122	8.91601	.08242	8.92231	.08362	32
29	.89692	.07887	.90337	.08005	.90977	.08124	.91612	.08244	.92241	.08364	31
30	.89703	.07889	.90348	.08007	.90988	.08126	.91622	.08246	.92252	.08366	30
31	.89714	.07891	.90359	.08009	.90998	.08128	.91633	.08248	.92262	.08368	29
+ 8′	8.89725	.07893	8.90369	.08011	8.91009	.08130	8.91643	.08250	8.92273	.08370	28
33	.89735	.07895	.90380	.08013	.91019	.08132	.91654	.08252	.92283	.08372	27
34	.89746	.07897	.90391	.08015	.91030	.08134	.91664	.08254	.92294	.08374	26
35	.89757	.07899	.90401	.08017	.91041	.08136	.91675	.08256	.92304	.08376	25
+ 9′	8.89768	.07901	8.90412	.08019	8.91051	.08138	8.91685	.08258	8.92315	.08378	24
37	.89779	.07903	.90423	.08021	.91062	.08140	.91696	.08260	.92325	.08380	23
38	.89789	.07905	.90433	.08023	.91073	.08142	.91707	.08262	.92335	.08382	22
39	.89800	.07907	.90444	.08025	.91083	.08144	.91717	.08264	.92346	.08384	21
+ 10′	8.89811	.07909	8.90455	.08027	8.91094	.08146	8.91728	.08266	8.92356	.08386	20
41	.89822	.07911	.90466	.08029	.91104	.08148	.91738	.08268	.92367	.08388	19
42	.89832	.07913	.90476	.08031	.91115	.08150	.91749	.08270	.92377	.08390	18
43	.89843	.07915	.90487	.08033	.91126	.08152	.91759	.08272	.92388	.08392	17
+ 11′	8.89854	.07917	8.90498	.08035	8.91136	.08154	8.91770	.08274	8.92398	.08394	16
45	.89865	.07919	.90508	.08037	.91147	.08156	.91780	.08276	.92409	.08396	15
46	.89875	.07921	.90519	.08039	.91157	.08158	.91791	.08278	.92419	.08398	14
47	.89886	.07923	.90530	.08041	.91168	.08100	.91801	.08280	.92429	.08400	13
+ 12′	8.89897	.07924	8.90540	.08043	8.91179	.08162	8.91812	.08282	8.92440	.08402	12
49	.89908	.07926	.90551	.08045	.91189	.08164	.91822	.08284	.92450	.08404	11
50	.89919	.07928	.90562	.08047	.91200	.08166	.91833	.08286	.92461	.08406	10
51	.89929	.07930	.90572	.08049	.91210	.08168	.91843	.08288	.92471	.08408	9
+ 13′	8.89940	.07932	8.90583	.08051	8.91221	.08170	8.91854	.08290	8.92482	.08410	8
53	.89951	.07934	.90594	.08053	.91232	.08172	.91864	.08292	.92492	.08412	7
54	.89962	.07936	.90604	.08055	.91242	.08174	.91875	.08294	.92502	.08414	6
55	.89972	.07938	.90615	.08057	.91253	.08176	.91885	.08296	.92513	.08416	5
+ 14′	8.89983	.07940	8.90626	.08059	8.91263	.08178	8.91896	.08298	8.92523	.08418	4
57	.89994	.07942	.90636	.08061	.91274	.08180	.91906	.08300	.92534	.08420	3
58	.90005	.07944	.90647	.08063	.91284	.08182	.91917	.08302	.92544	.08422	2
59	.90015	.07946	.90658	.08065	.91295	.08184	.91927	.08304	.92554	.08425	1
+ 15′	8.90026	.07948	8.90668	.08066	8.91306	.08186	8.91938	.08306	8.92565	.08427	0
	21h 49m		*21h 48m*		*21h 47m*		*21h 46m*		*21h 46m*		

TABLE 45.

Haversines.

	$2^h\ 15^m$ 33° 45′		$2^h\ 16^m$ 34° 0′		$2^h\ 17^m$ 34° 15′		$2^h\ 18^m$ 34° 30′		$2^h\ 19^m$ 34° 45′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	8.92565	**.08427**	8.93187	**.08548**	8.93805	**.08671**	8.94417	**.08794**	8.95025	**.08918**	60
1	.92575	**.08429**	.93197	**.08550**	.93815	**.08673**	.94427	**.08796**	.95035	**.08920**	59
2	.92586	**.08431**	.93208	**.08552**	.93825	**.08675**	.94438	**.08798**	.95045	**.08922**	58
3	.92596	**.08433**	.93218	**.08554**	.93835	**.08677**	.94448	**.08800**	.95055	**.08924**	57
+ 1′	8.92607	**.08435**	8.93228	**.08556**	8.93846	**.08679**	8.94458	**.08802**	8.95065	**.08926**	56
5	.92617	**.08437**	.93239	**.08558**	.93856	**.08681**	.94468	**.08804**	.95076	**.08928**	55
6	.92627	**.08439**	.93249	**.08560**	.93866	**.08683**	.94478	**.08806**	.95086	**.08930**	54
7	.92638	**.08441**	.93259	**.08562**	.93876	**.08685**	.94488	**.08808**	.95096	**.08932**	53
+ 2′	8.92648	**.08443**	8.93270	**.08564**	8.93886	**.08687**	8.94498	**.08810**	8.95106	**.08934**	52
9	.92659	**.08445**	.93280	**.08566**	.93897	**.08689**	.94509	**.08812**	.95116	**.08936**	51
10	.92669	**.08447**	.93290	**.08568**	.93907	**.08691**	.94519	**.08814**	.95126	**.08938**	50
11	.92679	**.08449**	.93301	**.08571**	.93917	**.08693**	.94529	**.08816**	.95136	**.08940**	49
+ 3′	8.92690	**.08451**	8.93311	**.08573**	8.93927	**.08695**	8.94539	**.08818**	8.95146	**.08943**	48
13	.92700	**.08453**	.93321	**.08575**	.93938	**.08697**	.94549	**.08820**	.95156	**.08945**	47
14	.92710	**.08455**	.93332	**.08577**	.93948	**.08699**	.94559	**.08823**	.95166	**.08947**	46
15	.92721	**.08457**	.93342	**.08579**	.93958	**.08701**	.94570	**.08825**	.95176	**.08949**	45
+ 4′	8.92731	**.08459**	8.93352	**.08581**	8.93968	**.08703**	8.94580	**.08827**	8.95186	**.08951**	44
17	.92742	**.08461**	.93363	**.08583**	.93979	**.08705**	.94590	**.08829**	.95197	**.08953**	43
18	.92752	**.08463**	.93373	**.08585**	.93989	**.08707**	.94600	**.08831**	.95207	**.08955**	42
19	.92762	**.08465**	.93383	**.08587**	.93999	**.08709**	.94610	**.08833**	.95217	**.08957**	41
+ 5′	8.92773	**.08467**	8.93393	**.08589**	8.94009	**.08711**	8.94620	**.08835**	8.95227	**.08959**	40
21	.92783	**.08469**	.93404	**.08591**	.94019	**.08714**	.94630	**.08837**	.95237	**.08961**	39
22	.92794	**.08471**	.93414	**.08593**	.94030	**.08716**	.94641	**.08839**	.95247	**.08963**	38
23	.92804	**.08473**	.93424	**.08595**	.94040	**.08718**	.94651	**.08841**	.95257	**.08965**	37
+ 6′	8.92814	**.08475**	8.93435	**.08597**	8.94050	**.08720**	8.94661	**.08843**	8.95267	**.08967**	36
25	.92825	**.08477**	.93445	**.08599**	.94060	**.08722**	.94671	**.08845**	.95277	**.08970**	35
26	.92835	**.08479**	.93455	**.08601**	.94071	**.08724**	.94681	**.08847**	.95287	**.08972**	34
27	.92845	**.08481**	.93466	**.08603**	.94081	**.08726**	.94691	**.08849**	.95297	**.08974**	33
+ 7′	8.92856	**.08483**	8.93476	**.08605**	8.94091	**.08728**	8.94701	**.08851**	8.95307	**.08976**	32
29	.92866	**.08485**	.93486	**.08607**	.94101	**.08730**	.94712	**.08853**	.95317	**.08978**	31
30	.92877	**.08487**	.93496	**.08609**	.94111	**.08732**	.94722	**.08856**	.95327	**.08980**	30
31	.92887	**.08489**	.93507	**.08611**	.94122	**.08734**	.94732	**.08858**	.95337	**.08982**	29
+ 8′	8.92897	**.08491**	8.93517	**.08613**	8.94132	**.08736**	8.94742	**.08860**	8.95347	**.08984**	28
33	.92908	**.08493**	.93527	**.08615**	.94142	**.08738**	.94752	**.08862**	.95357	**.08986**	27
34	.92918	**.08495**	.93538	**.08617**	.94152	**.08740**	.94762	**.08864**	.95368	**.08988**	26
35	.92928	**.08497**	.93548	**.08619**	.94162	**.08742**	.94772	**.08866**	.95378	**.08990**	25
+ 9′	8.92939	**.08499**	8.93558	**.08621**	8.94173	**.08744**	8.94782	**.08868**	8.95388	**.08992**	24
37	.92949	**.08501**	.93568	**.08624**	.94183	**.08746**	.94793	**.08870**	.95398	**.08994**	23
38	.92960	**.08503**	.93579	**.08626**	.94193	**.08748**	.94803	**.08872**	.95408	**.08997**	22
39	.92970	**.08505**	.93589	**.08628**	.94203	**.08750**	.94813	**.08874**	.95418	**.08999**	21
+ 10′	8.92980	**.08508**	8.93599	**.08630**	8.94213	**.08753**	8.94823	**.08876**	8.95428	**.09001**	20
41	.92991	**.08510**	.93610	**.08632**	.94224	**.08755**	.94833	**.08878**	.95438	**.09003**	19
42	.93001	**.08512**	.93620	**.08634**	.94234	**.08757**	.94843	**.08880**	.95448	**.09005**	18
43	.93011	**.08514**	.93630	**.08636**	.94244	**.08759**	.94853	**.08882**	.95458	**.09007**	17
+ 11′	8.93022	**.08516**	8.93640	**.08638**	8.94254	**.08761**	8.94863	**.08885**	8.95468	**.09009**	16
45	.93032	**.08518**	.93651	**.08640**	.94264	**.08763**	.94874	**.08887**	.95478	**.09011**	15
46	.93042	**.08520**	.93661	**.08642**	.94275	**.08765**	.94884	**.08889**	.95488	**.09013**	14
47	.93053	**.08522**	.93671	**.08644**	.94285	**.08767**	.94894	**.08891**	.95498	**.09015**	13
+ 12′	8.93063	**.08524**	8.93681	**.08646**	8.94295	**.08769**	8.94904	**.08893**	8.95508	**.09017**	12
49	.93073	**.08526**	.93692	**.08648**	.94305	**.08771**	.94914	**.08895**	.95518	**.09019**	11
50	.93084	**.08528**	.93702	**.08650**	.94315	**.08773**	.94924	**.08897**	.95528	**.09022**	10
51	.93094	**.08530**	.93712	**.08652**	.94326	**.08775**	.94934	**.08899**	.95538	**.09024**	9
+ 13′	8.93104	**.08532**	8.93722	**.08654**	8.94336	**.08777**	8.94944	**.08901**	8.95548	**.09026**	8
53	.93115	**.08534**	.93733	**.08656**	.94346	**.08779**	.94954	**.08903**	.95558	**.09028**	7
54	.93125	**.08536**	.93743	**.08658**	.94356	**.08781**	.94965	**.08905**	.95568	**.09030**	6
55	.93135	**.08538**	.93753	**.08660**	.94366	**.08783**	.94975	**.08907**	.95578	**.09032**	5
+ 14′	8.93146	**.08540**	8.93764	**.08662**	8.94376	**.08785**	8.94985	**.08909**	8.95588	**.09034**	4
57	.93156	**.08542**	.93774	**.08664**	.94387	**.08788**	.94995	**.08911**	.95598	**.09036**	3
58	.93166	**.08544**	.93784	**.08666**	.94397	**.08790**	.95005	**.08914**	.95608	**.09038**	2
59	.93177	**.08546**	.93794	**.08668**	.94407	**.08792**	.95015	**.08916**	.95618	**.09040**	1
+ 15′	8.93187	**.08548**	8.93805	**.08671**	8.94417	**.08794**	8.95025	**.08918**	8.95628	**.09042**	0
	$21^h\ 44^m$		$21^h\ 43^m$		$21^h\ 42^m$		$21^h\ 41^m$		$21^h\ 40^m$		

TABLE 45.

Haversines.

s	$2^h 20^m$ 35° 0′		$2^h 21^m$ 35° 15′		$2^h 22^m$ 35° 30′		$2^h 23^m$ 35° 45′		$2^h 24^m$ 36° 0′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	8.95628	.09042	8.96227	.09168	8.96821	.09294	8.97411	.09421	8.97997	.09549	60
1	.95638	.09044	.96237	.09170	.96831	.09296	.97421	.09423	.98006	.09551	59
2	.95648	.09047	.96247	.09172	.96841	.09298	.97431	.09426	.98016	.09553	58
3	.95658	.09049	.96257	.09174	.96851	.09301	.97441	.09428	.98026	.09556	57
+ 1′	8.95668	.09051	8.96267	.09176	8.96861	.09303	8.97450	.09430	8.98035	.09558	56
5	.95678	.09053	.96277	.09178	.96871	.09305	.97460	.09432	.98045	.09560	55
6	.95688	.09055	.96287	.09181	.96881	.09307	.97470	.09434	.98055	.09562	54
7	.95698	.09057	.96297	.09183	.96890	.69309	.97480	.09436	.98065	.09564	53
+ 2′	8.95709	.09059	8.96307	.09185	8.96900	.09311	8.97489	.09438	8.98074	.09566	52
9	.95719	.09061	.96317	.09187	.96910	.09313	.97499	.09440	.98084	.09568	51
10	.95729	.09063	.96326	.09189	.96920	.09315	.97509	.09443	.98094	.09571	50
11	.95739	.09065	.96336	.09191	.96930	.09317	.97519	.09445	.98103	.09573	49
+ 3′	8.95749	.09067	8.96346	.09193	8.96940	.09320	8.97529	.09447	8.98113	.09575	48
13	.95759	.09070	.96356	.09195	.96950	.09322	.97538	.09449	.98123	.09577	47
14	.95769	.09072	.96366	.09197	.96959	.09324	.97548	.09451	.98132	.09579	46
15	.95779	.09074	.96376	.09199	.96969	.09326	.97558	.09453	.98142	.09581	45
+ 4′	8.95789	.09076	8.96386	.09202	8.96979	.09328	8.97568	.09455	8.98152	.09583	44
17	.95799	.09078	.96396	.03204	.96989	.09330	.97577	.09457	.98162	.09586	43
18	.95809	.03080	.96406	.09206	.96999	.09332	.97587	.09460	.98171	.09588	42
19	.95819	.09082	.96416	.09208	.97009	.09334	.97597	.09462	.98181	.09590	41
+ 5′	8.95828	.09084	8.96426	.09210	8.97018	.09337	8.97607	.09464	8.98191	.09592	40
21	.95838	.09086	.96436	.09212	.97028	.09339	.97617	.09460	.98200	.09594	39
22	.95848	.09088	.96446	.09214	.97038	.09341	.97626	.09468	.98210	.09596	38
23	.95858	.09090	.96455	.09216	.97048	.09343	.97636	.09470	.98220	.09598	37
+ 6′	8.95868	.09093	8.96465	.09218	8.97058	.09345	8.97646	.09472	8.98229	.09601	36
25	.95878	.09095	.96475	.09220	.97068	.09347	.97656	.09474	.98239	.09603	35
26	.95888	.09097	.96485	.09223	.97077	.69349	.97665	.09477	.98249	.09095	34
27	.95898	.09099	.96495	.09225	.97087	.09351	.97675	.09479	.98259	.09097	33
+ 7′	8.95908	.09101	8.96505	.09227	8.97097	.09353	8.97685	.09481	8.98268	.09609	32
29	.95918	.09103	.96515	.09220	.97107	.09356	.97695	.09483	.98278	.09611	31
30	.95928	.09105	.96525	.09231	.97117	.09358	.97704	.09485	.98288	.09613	30
31	.95938	.09107	.96535	.09233	.97127	.09360	.97714	.09487	.98297	.69616	29
+ 8′	8.95948	.09109	8.96545	.09235	8.97136	.09362	8.97724	.09489	8.98307	.09618	28
33	.95958	.09111	.96555	.09237	.97146	.09364	.97734	.09492	.98317	.09620	27
34	.95968	.09113	.96564	.09239	.97156	.09366	.97743	.09494	.98326	.09622	26
35	.95978	.09116	.96574	.09242	.97166	.09368	.97753	.09496	.98336	.09624	25
+ 9′	8.95988	.09118	8.96584	.09244	8.97176	.09370	8.97763	.09498	8.98346	.09626	24
37	.95998	.09120	.96594	.09246	.97186	.09372	.97773	.09500	.98355	.09628	23
38	.96008	.09122	.96604	.09248	.97195	.09375	.97782	.09502	.98365	.09631	22
39	.96018	.09124	.96614	.09250	.97205	.09377	.97792	.09504	.98375	.09633	21
+ 10′	8.96028	.69126	8.96624	.09252	8.97215	.09379	8.97802	.09506	8.98384	.09635	20
41	.96038	.69128	.96634	.09254	.97225	.09381	.97812	.09509	.98394	.09637	19
42	.96048	.09130	.96644	.09256	.97235	.09383	.97821	.09511	.98404	.09639	18
43	.96058	.09132	.96653	.09258	.97244	.09385	.97831	.09513	.98413	.09641	17
+ 11′	8.96068	.09134	8.96663	.09260	8.97254	.09387	8.97841	.09515	8.98423	.09643	16
45	.96078	.09136	.96673	.09263	.97264	.09389	.97851	.09517	.98433	.09646	15
46	.96088	.09139	.96683	.09265	.97274	.09392	.97860	.09519	.98442	.09648	14
47	.96098	.09141	.96693	.09267	.97284	.09394	.97870	.09521	.98452	.09650	13
+ 12′	8.96108	.09143	8.96703	.09269	8.97294	.09396	8.97880	.09524	8.98462	.09652	12
49	.96118	.09145	.96713	.09271	.97303	.09398	.97890	.09526	.98471	.09654	11
50	.96128	.09147	.96723	.09273	.97313	.09460	.97899	.09528	.98481	.09656	10
51	.96138	.09149	.96733	.09275	.97323	.09402	.97909	.09530	.98491	.09658	9
+ 13′	8.96148	.09151	8.96742	.09277	8.97333	.09404	8.97919	.09532	8.98500	.09661	8
53	.96158	.09153	.96752	.09280	.97343	.09460	.97928	.09534	.98510	.09603	7
54	.96167	.09155	.96762	.09282	.97352	.09409	.97938	.09536	.98520	.09065	6
55	.96177	.09157	.96772	.09284	.97362	.09411	.97948	.09538	.98529	.09667	5
+ 14′	8.96187	.09160	8.96782	.09286	8.97372	.09413	8.97958	.09541	8.98539	.09669	4
57	.96197	.09162	.96792	.09288	.97382	.09415	.97967	.09543	.98549	.09671	3
58	.96207	.09164	.96802	.09290	.97392	.09417	.97977	.09545	.98558	.09673	2
59	.96217	.09166	.96812	.09292	.97401	.09419	.97987	.09547	.98568	.09676	1
+ 15′	8.96227	.09168	8.96821	.09294	8.97411	.09421	8.97997	.09549	8.98578	.09678	0
	$21^h 39^m$		$21^h 38^m$		$21^h 37^m$		$21^h 36^m$		$21^h 35^m$		

TABLE 45.

Haversines.

s	$2^h\ 25^m$ 36° 15′		$2^h\ 26^m$ 36° 30′		$2^h\ 27^m$ 36° 45′		$2^h\ 28^m$ 37° 0′		$2^h\ 29^m$ 37° 15′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	8.98578	.09678	8.99154	.09807	8.99727	.09937	9.00295	.10068	9.00860	.10200	60
1	.98587	.09680	.99164	.09809	.99736	.09939	.00305	.10070	.00869	.10202	59
2	.98597	.09682	.99173	.09811	.99746	.09952	.00314	.10073	.00878	.10204	58
3	.98606	.09684	.99183	.09814	.99755	.09944	.00324	.10075	.00888	.10206	57
+ 1′	8.98616	.09686	8.99193	.09816	8.99765	.09946	9.00333	.10077	9.00897	.10209	56
5	.98626	.09689	.99202	.09818	.99774	.09948	.00342	.10079	.00906	.10211	55
6	.98635	.09691	.99212	.09820	.99784	.09950	.00352	.10081	.00916	.10213	54
7	.98645	.09693	.99221	.09822	.99793	.09953	.00361	.10084	.00925	.10215	53
+ 2′	8.98655	.09695	8.99231	.09824	8.99803	.09955	9.00371	.10086	9.00935	.10218	52
9	.98664	.09697	.99240	.09827	.99812	.09957	.00380	.10088	.00944	.10220	51
10	.98674	.09699	.99250	.09829	.99822	.09959	.00390	.10090	.00953	.10222	50
11	.98684	.09701	.99260	.09831	.99831	.09961	.00399	.10092	.00963	.10224	49
+ 3′	8.98693	.09704	8.99269	.09833	8.99841	.09963	9.00408	.10095	9.00972	.10226	48
13	.98703	.09706	.99279	.09835	.99850	.09966	.00418	.10097	.00981	.10228	47
14	.98712	.09708	.99288	.09837	.99860	.09968	.00427	.10099	.00991	.10231	46
15	.98722	.09710	.99298	.09840	.99869	.09970	.00437	.10101	.01000	.10233	45
+ 4′	8.98732	.09712	8.99307	.09842	8.99879	.09972	9.00446	.10103	9.01009	.10235	44
17	.98741	.09714	.99317	.09844	.99888	.09974	.00456	.10105	.01019	.10237	43
18	.98751	.09717	.99327	.09846	.99898	.09977	.00465	.10108	.01028	.10240	42
19	.98761	.09719	.99336	.09848	.99907	.09979	.00474	.10110	.01037	.10242	41
+ 5′	8.98770	.09721	8.99346	.09850	8.99917	.09981	9.00484	.10112	9.01047	.10244	40
21	.98780	.09723	.99355	.09853	.99926	.09983	.00493	.10114	.01056	.10246	39
22	.98790	.09725	.99365	.09855	.99936	.09985	.00503	.10116	.01065	.10248	38
23	.98799	.09727	.99374	.09857	.99945	.09987	.00512	.10119	.01075	.10251	37
+ 6′	8.98809	.09729	8.99384	.09859	8.99955	.09990	9.00522	.10121	9.01084	.10253	36
25	.98818	.09732	.99393	.09861	.99964	.09992	.00531	.10123	.01094	.10255	35
26	.98828	.09734	.99403	.09863	.99974	.09994	.00540	.10125	.01103	.10257	34
27	.98838	.09736	.99412	.09866	.99983	.09996	.00550	.10127	01112	.10259	33
+ 7′	8.98847	.09738	8.99422	.09868	8.99993	.09998	9.00559	.10130	9.01122	.10262	32
29	.98857	.09740	.99432	.09870	9.00002	.10000	.00569	.10132	.01131	.10264	31
30	.98866	.09742	.99441	.09872	.00012	.10003	.00578	.10134	.01140	.10266	30
31	.98876	.09745	.99451	.09874	.00021	.10005	.00587	.10136	.01150	.10268	29
+ 8′	8.98886	.09747	8.99460	.09876	9.00031	.10007	9.00597	.10138	9.01159	.10270	28
33	.98895	.09749	.99470	.09879	.00040	.10009	.00606	.10141	.01168	.10273	27
34	.98905	.09751	.99479	.09881	.00049	.10011	.00616	.10143	.01178	.10275	26
35	.98915	.09753	.99489	.09883	.00059	.10014	.00625	.10145	.01187	.10277	25
+ 9′	8.98924	.09755	8.99498	.09885	9.00068	.10016	9.00634	.10147	9.01196	.10279	24
37	.98934	.09757	.99508	.09887	.00078	.10018	.00644	.10149	.01206	.10281	23
38	.98943	.09760	.99517	.09890	.00087	.10020	.00653	.10152	.01215	.10284	22
39	.98953	.09762	.99527	.09892	.00097	.10022	.00663	.10154	.01224	.10286	21
+ 10′	8.98963	.09764	8.99536	.09894	9.00106	.10025	9.00672	.10156	9.01234	.10288	20
41	.98972	.09766	.99546	.09896	.00116	.10027	.00681	.10158	.01243	.10290	19
42	.98982	.09768	.99556	.09898	.00125	.10029	.00691	.10160	.01252	.10293	18
43	.98991	.09770	.99565	.09900	.00135	.10031	.00700	.10163	.01262	.10295	17
+ 11′	8.99001	.09773	8.99575	.09903	9.00144	.10033	9.00710	.10165	9.01271	.10297	16
45	.99011	.09775	.99584	.09905	.00154	.10035	.00719	.10167	.01280	.10299	15
46	.99020	.09777	.99594	.09907	.00163	.10038	.00728	.10169	.01289	.10301	14
47	.99030	.09779	.99603	.09909	.00172	.10040	.00738	.10171	.01299	.10304	13
+ 12′	8.99039	.09781	8.99613	.09911	9.00182	.10042	9.00747	.10174	9.01308	.10306	12
49	.99049	.09783	.99622	.09913	.00191	.10044	.00756	.10176	.01317	.10308	11
50	.99058	.09786	.99632	.09916	.00201	.10046	.00766	.10178	.01327	.10310	10
51	.99068	.09788	.99641	.09918	.00210	.10049	.00775	.10180	.01336	.10312	9
+ 13′	8.99078	.09790	8.99651	.09920	9.00220	.10051	9.00785	.10182	9.01345	.10315	8
53	.99087	.09792	.99660	.09922	.00229	.10053	.00794	.10184	.01355	.10317	7
54	.99097	.09794	.99670	.09924	.00239	.10055	.00803	.10187	.01364	.10319	6
55	.99106	.09796	.99679	.09926	.00248	.10057	.00813	.10189	.01373	.10321	5
+ 14′	8.99116	.09799	8.99689	.09920	9.00258	.10059	9.00822	.10191	9.01383	.10323	4
57	.99126	.09861	.99698	.09931	.00267	.10062	.00831	.10193	.01392	.10326	3
58	.99135	.09803	.99708	.09933	.00276	.10064	.00841	.10196	.01401	.10328	2
59	.99145	.09805	.99717	.09935	.00286	.10066	.00850	.10198	.01411	.10330	1
+ 15′	8.99154	.09807	8.99727	.09937	9.00295	.10068	9.00860	.10200	9.01420	.10332	0
	$21^h\ 34^m$		$21^h\ 33^m$		$21^h\ 32^m$		$21^h\ 31^m$		$21^h\ 30^m$		

TABLE 45.

Haversines.

s	$2^h\ 30^m$ 37° 30′		$2^h\ 31^m$ 37° 45′		$2^h\ 32^m$ 38° 0′		$2^h\ 33^m$ 38° 15′		$2^h\ 34^m$ 38° 30′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.01420	**.10332**	9.01976	**.10466**	9.02528	**.10599**	9.03077	**.10734**	9.03621	**.10870**	60
1	.01429	**.10335**	.01985	**.10468**	.02538	**.10602**	.03086	**.10736**	.03630	**.10872**	59
2	.01438	**.10337**	.01995	**.10470**	.02547	**.10604**	.03095	**.10739**	.03639	**.10874**	58
3	.01448	**.10339**	.02004	**.10472**	.02556	**.10606**	.03104	**.10741**	.03648	**.10876**	57
+ 1′	9.01457	**.10341**	9.02013	**.10474**	9.02565	**.10608**	9.03113	**.10743**	9.03657	**.10879**	56
5	.01466	**.10343**	.02022	**.10477**	.02574	**.10611**	.03122	**.10745**	.03667	**.10881**	55
6	.01476	**.10346**	.02031	**.10479**	.02583	**.10613**	.03131	**.10748**	.03676	**.10883**	54
7	.01485	**.10348**	.02041	**.10481**	.02593	**.10615**	.03141	**.10750**	.03685	**.10885**	53
+ 2′	9.01494	**.10350**	9.02050	**.10483**	9.02602	**.10617**	9.03150	**.10752**	9.03694	**.10888**	52
9	.01504	**.10352**	.02059	**.10486**	.02611	**.10620**	.03159	**.10754**	.03703	**.10890**	51
10	.01513	**.10354**	.02068	**.10488**	.02620	**.10622**	.03168	**.10757**	.03712	**.10892**	50
11	.01522	**.10357**	.02078	**.10490**	.02629	**.10624**	.03177	**.10759**	.03721	**.10895**	49
+ 3′	9.01531	**.10359**	9.02087	**.10492**	9.02638	**.10626**	9.03186	**.10761**	9.03730	**.10897**	48
13	.01541	**.10361**	.02096	**.10494**	.02648	**.10629**	.03195	**.10763**	.03739	**.10899**	47
14	.01550	**.10363**	.02105	**.10497**	.02657	**.10631**	.03204	**.10766**	.03748	**.10901**	46
15	.01559	**.10366**	.02115	**.10499**	.02666	**.10633**	.03213	**.10768**	.03757	**.10904**	45
+ 4′	9.01569	**.10368**	9.02124	**.10501**	9.02675	**.10635**	9.03222	**.10770**	9.03766	**.10906**	44
17	.01578	**.10370**	.02133	**.10503**	.02684	**.10638**	.03231	**.10772**	.03775	**.10908**	43
18	.01587	**.10372**	.02142	**.10506**	.02693	**.10640**	.03241	**.10775**	.03784	**.10910**	42
19	.01596	**.10374**	.02151	**.10508**	.02702	**.10642**	.03250	**.10777**	.03793	**.10913**	41
+ 5′	9.01606	**.10377**	9.02161	**.10510**	9.02712	**.10644**	9.03259	**.10779**	9.03802	**.10915**	40
21	.01615	**.10379**	.02170	**.10512**	.02721	**.10647**	.03268	**.10781**	.03811	**.10917**	39
22	.01624	**.10381**	.02179	**.10515**	.02730	**.10649**	.03277	**.10784**	.03820	**.10919**	38
23	.01634	**.10383**	.02188	**.10517**	.02739	**.10651**	.03286	**.10786**	.03829	**.10922**	37
+ 6′	9.01643	**.10386**	9.02197	**.10519**	9.02748	**.10653**	9.03295	**.10788**	9.03838	**.10924**	36
25	.01652	**.10388**	.02207	**.10521**	.02757	**.10655**	.03304	**.10790**	.03847	**.10926**	35
26	.01661	**.10390**	.02216	**.10523**	.02767	**.10658**	.03313	**.10793**	.03856	**.10929**	34
27	.01671	**.10392**	.02225	**.10526**	.02776	**.10660**	.03322	**.10795**	.03865	**.10931**	33
+ 7′	9.01680	**.10394**	9.02234	**.10528**	9.02785	**.10662**	9.03331	**.10797**	9.03874	**.10933**	32
29	.01689	**.10397**	.02244	**.10530**	.02794	**.10664**	.03340	**.10799**	.03883	**.10935**	31
30	.01698	**.10399**	.02253	**.10532**	.02803	**.10667**	.03350	**.10802**	.03892	**.10938**	30
31	.01708	**.10401**	.02262	**.10535**	.02812	**.10669**	.03359	**.10804**	.03901	**.10940**	29
+ 8′	9.01717	**.10403**	9.02271	**.10537**	9.02821	**.10671**	9.03368	**.10806**	9.03910	**.10942**	28
33	.01726	**.10405**	.02280	**.10539**	.02830	**.10673**	.03377	**.10809**	.03919	**.10944**	27
34	.01736	**.10408**	.02290	**.10541**	.02840	**.10676**	.03386	**.10811**	.03928	**.10947**	26
35	.01745	**.10410**	.02299	**.10544**	.02849	**.10678**	.03395	**.10813**	.03937	**.10949**	25
+ 9′	9.01754	**.10412**	9.02308	**.10546**	9.02858	**.10680**	9.03404	**.10815**	9.03946	**.10951**	24
37	.01763	**.10414**	.02317	**.10548**	.02867	**.10682**	.03413	**.10818**	.03955	**.10953**	23
38	.01773	**.10417**	.02326	**.10550**	.02876	**.10685**	.03422	**.10820**	.03964	**.10956**	22
39	.01782	**.10419**	.02336	**.10552**	.02885	**.10687**	.03431	**.10822**	.03973	**.10958**	21
+ 10′	9.01791	**.10421**	9.02345	**.10555**	9.02894	**.10689**	9.03440	**.10824**	9.03982	**.10960**	20
41	.01800	**.10423**	.02354	**.10557**	.02904	**.10691**	.03449	**.10827**	.03991	**.10963**	19
42	.01810	**.10425**	.02363	**.10559**	.02913	**.10694**	.03458	**.10829**	.04000	**.10965**	18
43	.01819	**.10428**	.02372	**.10561**	.02922	**.10696**	.03467	**.10831**	.04009	**.10967**	17
+ 11′	9.01828	**.10430**	9.02381	**.10564**	9.02931	**.10698**	9.03476	**.10833**	9.04018	**.10969**	16
45	.01837	**.10432**	.02391	**.10566**	.02940	**.10700**	03486	**.10836**	.04027	**.10972**	15
46	.01847	**.10434**	.02400	**.10568**	.02949	**.10703**	.03495	**.10838**	.04036	**.10974**	14
47	.01856	**.10436**	.02409	**.10570**	.02958	**.10705**	.03504	**.10840**	.04045	**.10976**	13
+ 12′	9.01865	**.10439**	9.02418	**.10573**	9.02967	**.10707**	9.03513	**.10842**	9.04054	**.10978**	12
49	.01874	**.10441**	.02427	**.10575**	.02977	**.10709**	.03522	**.10845**	.04063	**.10981**	11
50	.01884	**.10443**	.02437	**.10577**	.02986	**.10712**	.03531	**.10847**	.04072	**.10983**	10
51	.01893	**.10445**	.02446	**.10579**	.02995	**.10714**	.03540	**.10849**	.04081	**.10985**	9
+ 13′	9.01902	**.10448**	9.02455	**.10582**	9.03004	**.10716**	9.03549	**.10851**	9.04090	**.10988**	8
53	.01911	**.10450**	.02464	**.10584**	.03013	**.10718**	.03558	**.10854**	.04099	**.10990**	7
54	.01921	**.10452**	.02473	**.10586**	.03022	**.10721**	.03567	**.10856**	.04108	**.10992**	6
55	.01930	**.10454**	.02483	**.10588**	.03031	**.10723**	.03576	**.10858**	.04117	**.10994**	5
+ 14′	9.01939	**.10457**	9.02492	**.10591**	9.03040	**.10725**	9.03585	**.10861**	9.04126	**.10997**	4
57	01948	**.10459**	.02501	**.10593**	.03050	**.10727**	.03594	**.10863**	.04135	**.10999**	3
58	.01958	**.10461**	.02510	**.10595**	.03059	**.10730**	.03603	**.10865**	.04144	**.11001**	2
59	.01967	**.10463**	.02519	**.10597**	.03068	**.10732**	.03612	**.10867**	.04153	**.11004**	1
+ 15′	9.01976	**.10466**	9.02528	**.10599**	9.03077	**.10734**	9.03621	**.10870**	9.04162	**.11006**	0
	$21^h\ 29^m$		$21^h\ 28^m$		$21^h\ 27^m$		$21^h\ 26^m$		$21^h\ 25^m$		

TABLE 45.

Haversines.

	$2^{h}\,35^{m}$ 38° 45′		$2^{h}\,36^{m}$ 39° 0′		$2^{h}\,37^{m}$ 39° 15′		$2^{h}\,38^{m}$ 39° 30′		$2^{h}\,39^{m}$ 39° 45′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.04162	**.11006**	9.04699	**.11143**	9.05232	**.11280**	9.05762	**.11419**	9.06288	**.11558**	60
1	.04171	**.11008**	.04708	**.11145**	.05241	**.11283**	.05771	**.11421**	.06297	**.11560**	59
2	.04180	**.11010**	.04717	**.11147**	.05250	**.11285**	.05780	**.11423**	.06305	**.11563**	58
3	.04189	**.11013**	.04726	**.11150**	.05259	**.11287**	.05788	**.11426**	.06314	**.11565**	57
+ 1′	9.04198	**.11015**	9.04735	**.11152**	9.05268	**.11290**	9.05797	**.11428**	9.06323	**.11567**	56
5	.04207	**.11017**	.04744	**.11154**	.05277	**.11292**	.05806	**.11430**	.06332	**.11569**	55
6	.04216	**.11019**	.04753	**.11156**	.05285	**.11294**	.05815	**.11433**	.06340	**.11572**	54
7	.04225	**.11022**	.04761	**.11159**	.05294	**.11296**	.05823	**.11435**	.06349	**.11574**	53
+ 2′	9.04234	**.11024**	9.04770	**.11161**	9.05303	**.11299**	9.05832	**.11437**	9.06358	**.11577**	52
9	.04243	**.11026**	.04779	**.11163**	.05312	**.11301**	.05841	**.11440**	.06367	**.11579**	51
10	.04252	**.11029**	.04788	**.11166**	.05321	**.11303**	.05850	**.11442**	.06375	**.11581**	50
11	.04261	**.11031**	.04797	**.11168**	.05330	**.11306**	.05859	**.11444**	.06384	**.11584**	49
+ 3′	9.04270	**.11033**	9.04806	**.11170**	9.05339	**.11308**	9.05867	**.11447**	9.06393	**.11586**	48
13	.04279	**.11035**	.04815	**.11172**	.05347	**.11310**	.05876	**.11449**	.06401	**.11588**	47
14	.04288	**.11038**	.04824	**.11175**	.05356	**.11313**	.05885	**.11451**	.06410	**.11590**	46
15	.04297	**.11040**	.04833	**.11177**	.05365	**.11315**	.05894	**.11453**	.06419	**.11593**	45
+ 4′	9.04306	**.11042**	9.04842	**.11179**	9.05374	**.11317**	9.05903	**.11456**	9.06428	**.11595**	44
17	.04315	**.11044**	.04851	**.11182**	.05383	**.11320**	.05911	**.11458**	.06436	**.11597**	43
18	.04324	**.11047**	.04859	**.11184**	.05392	**.11322**	.05920	**.11460**	.06445	**.11600**	42
19	.04333	**.11049**	.04868	**11186**	.05400	**.11324**	.05929	**.11463**	.06454	**.11602**	41
+ 5′	9.04341	**.11051**	9.04877	**.11189**	9.05409	**.11326**	9.05938	**.11465**	9.06462	**.11604**	40
21	.04350	**.11054**	.04886	**.11191**	.05418	**.11329**	.05946	**.11467**	.06471	**.11607**	39
22	.04359	**.11056**	.04895	**.11193**	.05427	**.11331**	.05955	**.11470**	.06480	**.11609**	38
23	.04368	**.11058**	.04904	**.11195**	.05436	**.11333**	.05964	**.11472**	.06489	**.11611**	37
+ 6′	9.04377	**.11060**	9.04913	**.11198**	9.05445	**.11336**	9.05973	**.11474**	9.06497	**.11614**	36
25	.04386	**.11063**	.04922	**.11200**	.05453	**.11338**	.05982	**.11477**	.06506	**.11616**	35
26	.04395	**.11065**	.04931	**.11202**	.05462	**.11340**	.05990	**.11479**	.06515	**.11618**	34
27	.04404	**.11067**	.04939	**.11205**	.05471	**.11343**	.05999	**.11481**	.06523	**.11621**	33
+ 7′	9.04413	**.11070**	9.04948	**.11207**	9.05480	**.11345**	9.06008	**.11484**	9.06532	**.11623**	32
29	.04422	**.11072**	.04957	**.11209**	.05489	**.11347**	.06017	**.11486**	.06541	**.11625**	31
30	.04431	**.11074**	.04966	**.11211**	.05498	**.11349**	.06025	**.11488**	.06550	**.11628**	30
31	.04440	**.11076**	.04975	**.11214**	.05506	**.11352**	.06034	**.11491**	.06558	**.11630**	29
+ 8′	9.04449	**.11079**	9.04984	**.11216**	9.05515	**.11354**	9.06043	**.11493**	9.06567	**.11632**	28
33	.04458	**.11081**	.04993	**.11218**	.05524	**.11356**	.06052	**.11495**	.06576	**.11635**	27
34	.04467	**.11083**	.05002	**.11221**	.05533	**.11359**	.06060	**.11498**	.06584	**.11637**	26
35	.04476	**.11086**	.05011	**.11223**	.05542	**.11361**	.06069	**.11500**	.06593	**.11639**	25
+ 9′	9.04485	**.11088**	9.05019	**.11225**	9.05551	**.11363**	9.06078	**.11502**	9.06602	**.11642**	24
37	.04494	**.11090**	.05028	**.11228**	.05559	**.11366**	.06087	**.11504**	.06611	**.11644**	23
38	.04503	**.11092**	.05037	**.11230**	.05568	**.11368**	.06095	**.11507**	.06619	**.11646**	22
39	.04512	**.11095**	.05046	**.11232**	.05577	**.11370**	.06104	**.11509**	.06628	**.11649**	21
+ 10′	9.04520	**.11097**	9.05055	**.11234**	9.05586	**.11373**	9.06113	**.11511**	9.06637	**.11651**	20
41	.04529	**.11099**	.05064	**.11237**	.05595	**.11375**	.06122	**.11514**	.06645	**.11653**	19
42	.04538	**.11102**	.05073	**.11239**	.05603	**.11377**	.06131	**.11516**	.06654	**.11656**	18
43	.04547	**.11104**	.05082	**.11241**	.05612	**.11379**	.06139	**.11518**	.06663	**.11658**	17
+ 11′	9.04556	**.11106**	9.05090	**.11244**	9.05621	**.11382**	9.06148	**.11521**	9.06671	**.11660**	16
45	.04565	**.11108**	.05099	**.11246**	.05630	**.11384**	.06157	**.11523**	.06680	**.11663**	15
46	.04574	**.11111**	.05108	**.11248**	.05639	**.11386**	.06166	**.11525**	.06689	**.11665**	14
47	.04583	**.11113**	.05117	**.11251**	.05648	**.11389**	.06174	**.11528**	.06697	**.11667**	13
+ 12′	9.04592	**.11115**	9.05126	**.11253**	9.05656	**.11391**	9.06183	**.11530**	9.06706	**.11670**	12
49	.04601	**.11117**	.05135	**.11255**	.05665	**.11393**	.06192	**.11532**	.06715	**.11672**	11
50	.04610	**.11120**	.05144	**.11257**	.05674	**.11396**	.06201	**.11535**	.06724	**.11674**	10
51	.04619	**.11122**	.05153	**.11260**	.05683	**.11398**	.06209	**.11537**	.06732	**.11677**	9
+ 13′	9.04628	**.11124**	9.05161	**.11262**	9.05692	**.11400**	9.06218	**.11539**	9.06741	**.11679**	8
53	.04637	**.11127**	.05170	**.11264**	.05700	**.11403**	.06227	**.11542**	.06750	**.11681**	7
54	.04646	**.11129**	.05179	**.11267**	.05709	**.11405**	.06235	**.11544**	.06758	**.11684**	6
55	.04654	**.11131**	.05188	**.11269**	.05718	**.11407**	.06244	**.11546**	.06767	**.11686**	5
+ 14′	9.04663	**.11134**	9.05197	**.11271**	9.05727	**.11410**	9.06253	**.11549**	9.06776	**.11688**	4
57	.04672	**.11136**	.05206	**.11274**	.05736	**.11412**	.06262	**.11551**	.06784	**.11691**	3
58	.04681	**.11138**	.05215	**.11276**	.05744	**.11414**	.06270	**.11553**	.06793	**.11693**	2
59	.04690	**.11140**	.05223	**.11278**	.05753	**.11416**	.06279	**.11556**	.06802	**.11695**	1
+ 15′	9.04699	**.11143**	9.05232	**.11280**	9.05762	**.11419**	9.06288	**.11558**	9.06810	**.11698**	0
	$21^{h}\,24^{m}$		$21^{h}\,23^{m}$		$21^{h}\,22^{m}$		$21^{h}\,21^{m}$		$21^{h}\,20^{m}$		

TABLE 45.

Haversines.

s	$2^h\ 40^m$ 40° 0′		$2^h\ 41^m$ 40° 15′		$2^h\ 42^m$ 40° 30′		$2^h\ 43^m$ 40° 45′		$2^h\ 44^m$ 41° 0′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.06810	.11698	9.07329	.11838	9.07845	.11980	9.08357	.12122	9.08865	.12265	60
1	.06819	.11700	.07338	.11841	.07853	.11982	.08365	.12124	.08874	.12267	59
2	.06828	.11702	.07346	.11843	.07862	.11984	.08374	.12127	.08882	.12269	58
3	.06836	.11705	.07355	.11845	.07870	.11987	.08382	.12129	.08890	.12272	57
+ 1′	9.06845	.11707	9.07364	.11848	9.07879	.11989	9.08391	.12131	9.08899	.12274	56
5	.06854	.11709	.07372	.11850	.07887	.11992	.08399	.12134	.08907	.12276	55
6	.06862	.11712	.07381	.11852	.07896	.11994	.08408	.12136	.08916	.12279	54
7	.06871	.11714	.07390	.11855	.07905	.11996	.08416	.12138	.08924	.12281	53
+ 2′	9.06880	.11716	9.07398	.11857	9.07913	.11999	9.08425	.12141	9.08933	.12284	52
9	.06888	.11719	.07407	.11860	.07922	.12001	.08433	.12143	.08941	.12286	51
10	.06897	.11721	.07415	.11862	.07930	.12003	.08442	.12146	.08949	.12288	50
11	.06906	.11724	.07424	.11864	.07939	.12006	.08450	.12148	.08958	.12291	49
+ 3′	9.06914	.11726	9.07433	.11867	9.07947	.12008	9.08459	.12150	9.08966	.12293	48
13	.06923	.11728	.07441	.11869	.07956	.12010	.08467	.12153	.08975	.12296	47
14	.06932	.11731	.07450	.11871	.07964	.12013	.08475	.12155	.08983	.12298	46
15	.06940	.11733	.07458	.11874	.07973	.12015	.08484	.12157	.08992	.12300	45
+ 4′	9.06949	.11735	9.07467	.11876	9.07981	.12018	9.08492	.12160	9.09000	.12303	44
17	.06958	.11738	.07476	.11878	.07990	.12020	.08501	.12162	.09009	.12305	43
18	.06966	.11740	.07484	.11881	.07999	.12022	.08509	.12165	.09017	.12307	42
19	.06975	.11742	.07493	.11883	.08007	.12025	.08518	.12167	.09025	.12310	41
+ 5′	9.06984	.11745	9.07501	.11885	9.08016	.12027	9.08526	.12169	9.09034	.12312	40
21	.06992	.11747	.07510	.11888	.08024	.12029	.08535	.12172	.09042	.12315	39
22	.07001	.11749	.07519	.11890	.08033	.12032	.08543	.12174	.09051	.12317	38
23	.07010	.11752	.07527	.11892	.08041	.12034	.08552	.12176	.09059	.12319	37
+ 6′	9.07018	.11754	9.07536	.11895	9.08050	.12036	9.08560	.12179	9.09068	.12322	36
25	.07027	.11756	.07544	.11897	.08058	.12039	.08569	.12181	.09076	.12324	35
26	.07036	.11759	.07553	.11900	.08067	.12041	.08577	.12184	.09084	.12327	34
27	.07044	.11761	.07562	.11902	.08075	.12044	.08586	.12186	.09093	.12329	33
+ 7′	9.07053	.11763	9.07570	.11904	9.08084	.12046	9.08594	.12188	9.09101	.12331	32
29	.07062	.11766	.07579	.11907	.08092	.12048	.08603	.12191	.09110	.12334	31
30	.07070	.11768	.07587	.11909	.08101	.12051	.08611	.12193	.09118	.12336	30
31	.07079	.11770	.07596	.11911	.08110	.12053	.08620	.12195	.09126	.12339	29
+ 8′	9.07088	.11773	9.07605	.11914	9.08118	.12055	9.08628	.12198	9.09135	.12341	28
33	.07096	.11775	.07613	.11916	.08127	.12058	.08637	.12200	.09143	.12343	27
34	.07105	.11777	.07622	.11918	.08135	.12060	.08645	.12203	.09152	.12346	26
35	.07113	.11780	.07630	.11921	.08144	.12062	.08654	.12205	.09160	.12348	25
+ 9′	9.07122	.11782	9.07639	.11923	9.08152	.12065	9.08662	.12207	9.09169	.12351	24
37	.07131	.11784	.07647	.11925	.08161	.12067	.08671	.12210	.09177	.12353	23
38	.07139	.11787	.07656	.11928	.08169	.12070	.08679	.12212	.09185	.12355	22
39	.07148	.11789	.07665	.11930	.08178	.12072	.08687	.12214	.09194	.12358	21
+ 10′	9.07157	.11791	9.07673	.11933	9.08186	.12074	9.08696	.12217	9.09202	.12360	20
41	.07165	.11794	.07682	.11935	.08195	.12077	.08704	.12219	.09211	.12363	19
42	.07174	.11796	.07690	.11937	.08203	.12079	.08713	.12222	.09219	.12365	18
43	.07183	.11798	.07699	.11940	.08212	.12081	.08721	.12224	.09227	.12367	17
+ 11′	9.07191	.11801	9.07708	.11942	9.08220	.12084	9.08730	.12226	9.09236	.12370	16
45	.07200	.11803	.07716	.11944	.08229	.12086	.08738	.12229	.09244	.12372	15
46	.07208	.11806	.07725	.11947	.08237	.12089	.08747	.12231	.09253	.12374	14
47	.07217	.11808	.07733	.11949	.08246	.12091	.08755	.12233	.09261	.12377	13
+ 12′	9.07226	.11810	9.07742	.11951	9.08254	.12093	9.08764	.12236	9.09269	.12379	12
49	.07234	.11813	.07750	.11954	.08263	.12096	.08772	.12238	.09278	.12382	11
50	.07243	.11815	.07759	.11956	.08271	.12098	.08781	.12241	.09286	.12384	10
51	.07252	.11817	.07768	.11958	.08280	.12100	.08789	.12243	.09295	.12386	9
+ 13′	9.07260	.11820	9.07776	.11961	9.08288	.12103	9.08797	.12245	9.09303	.12389	8
53	.07269	.11822	.07785	.11963	.08297	.12105	.08806	.12248	.09311	.12391	7
54	.07277	.11824	.07793	.11966	.08306	.12108	.08814	.12250	.09320	.12394	6
55	.07286	.11827	.07802	.11968	.08314	.12110	.08823	.12253	.09328	.12396	5
+ 14′	9.07295	.11829	9.07810	.11970	9.08323	.12112	9.08831	.12255	9.09337	.12398	4
57	.07303	.11831	.07819	.11973	.08331	.12115	.08840	.12257	.09345	.12401	3
58	.07312	.11834	.07827	.11975	.08340	.12117	.08848	.12260	.09353	.12403	2
59	.07321	.11836	.07836	.11977	.08348	.12119	.08857	.12262	.09362	.12406	1
+ 15′	9.07329	.11838	9.07845	.11980	9.08357	.12122	9.08865	.12265	9.09370	.12408	0
	$21^h\ 19^m$		$21^h\ 18^m$		$21^h\ 17^m$		$21^h\ 16^m$		$21^h\ 15^m$		

TABLE 45.

Haversines.

s	$2^h\ 45^m$ 41° 15′		$2^h\ 46^m$ 41° 30′		$2^h\ 47^m$ 41° 45′		$2^h\ 48^m$ 42° 0′		$2^h\ 49^m$ 42° 15′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.09370	.12408	9.09872	.12552	9.10371	.12697	9.10866	.12843	9.11358	.12989	60
1	.09379	.12410	.09880	.12555	.10379	.12700	.10874	.12845	.11366	.12992	59
2	.09387	.12413	.09889	.12557	.10387	.12702	.10882	.12848	.11374	.12994	58
3	.09395	.12415	.09897	.12559	.10395	.12704	.10891	.12850	.11382	.12096	57
+ 1′	9.09404	.12418	9.09905	.12562	9.10404	.12707	9.10899	.12852	9.11391	.12999	56
5	.09412	.12420	.09914	.12564	.10412	.12709	.10907	.12855	.11399	.13001	55
6	.09421	.12422	.09922	.12567	.10420	.12712	.10915	.12857	.11407	.13004	54
7	.09429	.12425	.09930	.12569	.10429	.12714	.10923	.12860	.11415	.13006	53
+ 2′	9.09437	.12427	9.09939	.12572	9.10437	.12717	9.10932	.12862	9.11423	.13009	52
9	.09446	.12430	.09947	.12574	.10445	.12719	.10940	.12865	.11431	.13011	51
10	.09454	.12432	.09955	.12576	.10453	.12721	.10948	.12867	.11440	.13014	50
11	.09462	.12434	.09964	.12579	.10462	.12724	.10956	.12870	.11448	.13016	49
+ 3′	9.09471	.12437	9.09972	.12581	9.10470	.12726	9.10965	.12872	9.11456	.13018	48
13	.09479	.12439	.09980	.12584	.10478	.12729	.10973	.12874	.11464	.13021	47
14	.09488	.12442	.09989	.12586	.10486	.12731	.10981	.12877	.11472	.13023	46
15	.09496	.12444	.09997	.12588	.10495	.12733	.10989	.12879	.11480	.13026	45
+ 4′	9.09504	.12446	9.10005	.12591	9.10503	.12736	9.10997	.12882	9.11489	.13028	44
17	.09513	.12449	.10014	.12593	.10511	.12738	.11006	.12884	.11497	.13031	43
18	.09521	.12451	.10022	.12596	.10519	.12741	.11014	.12887	.11505	.13033	42
19	.09529	.12454	.10030	.12598	.10528	.12743	.11022	.12889	.11513	.13036	41
+ 5′	9.09538	.12456	9.10039	.12600	9.10536	.12746	9.11030	.12891	9.11521	.13038	40
21	.09546	.12458	.10047	.12603	.10544	.12748	.11038	.12894	.11529	.13041	39
22	.09555	.12461	.10055	.12605	.10553	.12750	.11047	.12896	.11538	.13043	38
23	.09563	.12463	.10064	.12608	.10561	.12753	.11055	.12899	.11546	.13045	37
+ 6′	9.09571	.12466	9.10072	.12610	9.10569	.12755	9.11063	.12901	9.11554	.13048	36
25	.09580	.12468	.10080	.12613	.10577	.12758	.11071	.12904	.11562	.13050	35
26	.09588	.12470	.10088	.12615	.10586	.12760	.11079	.12906	.11570	.13053	34
27	.09596	.12473	.10097	.12617	.10594	.12763	.11088	.12909	.11578	.13055	33
+ 7′	9.09605	.12475	9.10105	.12620	9.10602	.12765	9.11096	.12911	9.11586	.13058	32
29	.09613	.12478	.10113	.12622	.10610	.12767	.11104	.12913	.11595	.13060	31
30	.09622	.12480	.10122	.12625	.10619	.12770	.11112	.12916	.11603	.13063	30
31	.09630	.12482	.10130	.12627	.10627	.12772	.11120	.12918	.11611	.13065	29
+ 8′	9.09638	.12485	9.10138	.12629	9.10635	.12775	9.11129	.12921	9.11619	.13067	28
33	.09647	.12487	.10147	.12632	.10643	.12777	.11137	.12923	.11627	.13070	27
34	.09655	.12490	.10155	.12634	.10652	.12780	.11145	.12926	.11635	.13072	26
35	.09663	.12492	.10163	.12637	.10660	.12782	.11153	.12928	.11643	.13075	25
+ 9′	9.09672	.12494	9.10172	.12639	9.10668	.12784	9.11161	.12930	9.11652	.13077	24
37	.09680	.12497	.10180	.12641	.10676	.12787	.11170	.12933	.11660	.13080	23
38	.09688	.12499	.10188	.12644	.10685	.12789	.11178	.12935	.11668	.13082	22
39	.09697	.12502	.10196	.12646	.10693	.12792	.11186	.12938	.11676	.13085	21
+ 10′	9.09705	.12504	9.10205	.12649	9.10701	.12794	9.11194	.12940	9.11684	.13087	20
41	.09713	.12506	.10213	.12651	.10709	.12797	.11202	.12943	.11692	.13090	19
42	.09722	.12509	.10221	.12654	.10718	.12799	.11211	.12945	.11700	.13092	18
43	.09730	.12511	.10230	.12656	.10726	.12801	.11219	.12948	.11709	.13095	17
+ 11′	9.09739	.12514	9.10238	.12658	9.10734	.12804	9.11227	.12950	9.11717	.13097	16
45	.09747	.12516	.10246	.12661	.10742	.12806	.11235	.12952	.11725	.13099	15
46	.09755	.12519	.10255	.12663	.10751	.12809	.11243	.12955	.11733	.13102	14
47	.09764	.12521	.10263	.12666	.10759	.12811	.11252	.12957	.11741	.13104	13
+ 12′	9.09772	.12523	9.10271	.12668	9.10767	.12814	9.11260	.12960	9.11749	.13107	12
49	.09780	.12526	.10279	.12671	.10775	.12816	.11268	.12962	.11757	.13109	11
50	.09789	.12528	.10288	.12673	.10784	.12818	.11276	.12965	.11766	.13112	10
51	.09797	.12531	.10296	.12675	.10792	.12821	.11284	.12967	.11774	.13114	9
+ 13′	9.09805	.12533	9.10304	.12678	9.10800	.12823	9.11292	.12970	9.11782	.13116	8
53	.09814	.12536	.10313	.12680	.10808	.12826	.11301	.12972	.11790	.13119	7
54	.09822	.12538	.10321	.12683	.10816	.12828	.11309	.12974	.11798	.13121	6
55	.09830	.12540	.10329	.12685	.10825	.12831	.11317	.12077	.11806	.13124	5
+ 14′	9.09839	.12543	9.10337	.12687	9.10833	.12833	9.11325	.12979	9.11814	.13126	4
57	.09847	.12545	.10346	.12690	.10841	.12836	.11333	.12982	.11822	.13129	3
58	.09856	.12547	.10354	.12692	.10849	.12838	.11342	.12984	.11831	.13131	2
59	.09864	.12550	.10362	.12695	.10858	.12840	.11350	.12987	.11839	.13134	1
+ 15′	9.09872	.12552	9.10371	.12697	9.10866	.12843	9.11358	.12989	9.11847	.13136	0
	$21^h\ 14^m$		$21^h\ 13^m$		$21^h\ 12^m$		$21^h\ 11^m$		$21^h\ 10^m$		

TABLE 45.

Haversines.

	$2^h\,50^m$ 42° 30′		$2^h\,51^m$ 42° 45′		$2^h\,52^m$ 43° 0′		$2^h\,53^m$ 43° 15′		$2^h\,54^m$ 43° 30′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.11847	.13136	9.12332	.13284	9.12815	.13432	9.13295	.13581	9.13771	.13731	60
1	.11855	.13139	.12341	.13286	.12823	.13435	.13303	.13584	.13779	.13734	59
2	.11863	.13141	.12349	.13289	.12831	.13437	.13311	.13586	.13787	.13736	58
3	.11871	.13143	.12357	.13291	.12839	.13440	.13319	.13589	.13795	.13739	57
+ 1′	9.11879	.13146	9.12365	.13294	9.12847	.13442	9.13326	.13591	9.13803	.13741	56
5	.11887	.13148	.12373	.13296	.12855	.13445	.13334	.13594	.13811	.13744	55
6	.11895	.13151	.12381	.13299	.12863	.13447	.13342	.13596	.13819	.13746	54
7	.11904	.13153	.12389	.13301	.12871	.13450	.13350	.13599	.13827	.13749	53
+ 2′	9.11912	.13156	9.12397	.13304	9.12879	.13452	9.13358	.13601	9.13834	.13751	52
9	.11920	.13158	.12405	.13306	.12887	.13455	.13366	.13604	.13842	.13754	51
10	.11928	.13161	.12413	.13309	.12895	.13457	.13374	.13607	.13850	.13756	50
11	.11936	.13163	.12421	.13311	.12903	.13460	.13382	.13609	.13858	.13759	49
+ 3′	9.11944	.13166	9.12429	.13314	9.12911	.13462	9.13390	.13611	9.13866	.13761	48
13	.11952	.13168	.12437	.13316	.12919	.13465	.13398	.13614	.13874	.13764	47
14	.11960	.13171	.12445	.13318	.12927	.13467	.13406	.13616	.13882	.13760	46
15	.11968	.13173	.12453	.13321	.12935	.13470	.13414	.13619	.13890	.13769	45
+ 4′	9.11977	.13175	9.12461	.13323	9.12943	.13472	9.13422	.13621	9.13898	.13771	44
17	.11985	.13178	.12470	.13326	.12951	.13474	.13430	.13624	.13906	.13774	43
18	.11993	.13180	.12478	.13328	.12959	.13477	.13438	.13626	.13913	.13776	42
19	.12001	.13183	.12486	.13331	.12967	.13479	.13446	.13629	.13921	.13779	41
+ 5′	9.12009	.13185	9.12494	.13333	9.12975	.13482	9.13454	.13631	9.13929	.13781	40
21	.12017	.13188	.12502	.13336	.12983	.13484	.13462	.13634	.13937	.13784	39
22	.12025	.13190	.12510	.13338	.12991	.13487	.13470	.13636	.13945	.13786	38
23	.12033	.13193	.12518	.13341	.12999	.13489	.13478	.13639	.13953	.13789	37
+ 6′	9.12041	.13195	9.12526	.13343	9.13007	.13492	9.13486	.13641	9.13961	.13791	36
25	.12050	.13198	.12534	.13346	.13015	.13494	.13494	.13644	.13969	.13794	35
26	.12058	.13200	.12542	.13348	.13023	.13497	.13501	.13646	.13977	.13796	34
27	.12066	.13203	.12550	.13351	.13031	.13499	.13509	.13649	.13985	.13799	33
+ 7′	9.12074	.13205	9.12558	.13353	9.13039	.13502	9.13517	.13651	9.13992	.13801	32
29	.12082	.13207	.12566	.13356	.13047	.13504	.13525	.13654	.14000	.13804	31
30	.12090	.13210	.12574	.13358	.13055	.13507	.13533	.13656	.14008	.13806	30
31	.12098	.13212	.12582	.13360	.13063	.13509	.13541	.13659	.14016	.13809	29
+ 8′	9.12106	.13215	9.12590	.13363	9.13071	.13512	9.13549	.13661	9.14024	.13811	28
33	.12114	.13217	.12598	.13365	.13079	.13514	.13557	.13664	.14032	.13814	27
34	.12122	.13220	.12606	.13368	.13087	.13517	.13565	.13666	.14040	.13816	26
35	.12130	.13222	.12614	.13370	.13095	.13519	.13573	.13669	.14048	.13819	25
+ 9′	9.12139	.13225	9.12622	.13373	9.13103	.13522	9.13581	.13671	9.14056	.13822	24
37	.12147	.13227	.12630	.13375	.13111	.13524	.13589	.13674	.14063	.13824	23
38	.12155	.13230	.12638	.13378	.13119	.13527	.13597	.13676	.14071	.13827	22
39	.12163	.13232	.12647	.13380	.13127	.13529	.13605	.13679	.14079	.13829	21
+ 10′	9.12171	.13235	9.12655	.13383	9.13135	.13532	9.13613	.13681	9.14087	.13832	20
41	.12179	.13237	.12663	.13385	.13143	.13534	.13621	.13684	.14095	.13834	19
42	.12187	.13239	.12671	.13388	.13151	.13537	.13628	.13686	.14103	.13837	18
43	.12195	.13242	.12679	.13390	.13159	.13539	.13636	.13689	.14111	.13839	17
+ 11′	9.12203	.13244	9.12687	.13393	9.13167	.13542	9.13644	.13691	9.14119	.13842	16
45	.12211	.13247	.12695	.13395	.13175	.13544	.13652	.13694	.14127	.13844	15
46	.12219	.13249	.12703	.13398	.13183	.13547	.13660	.13696	.14134	.13847	14
47	.12228	.13252	.12711	.13400	.13191	.13549	.13668	.13609	.14142	.13849	13
+ 12′	9.12236	.13254	9.12719	.13403	9.13199	.13552	9.13676	.13701	9.14150	.13852	12
49	.12244	.13257	.12727	.13405	.13207	.13554	.13684	.13704	.14158	.13854	11
50	.12252	.13259	.12735	.13408	.13215	.13557	.13692	.13706	.14166	.13857	10
51	.12260	.13262	.12743	.13410	.13223	.13559	.13700	.13709	.14174	.13859	9
+ 13′	9.12268	.13264	9.12751	.13412	9.13231	.13562	9.13708	.13711	9.14182	.13862	8
53	.12276	.13267	.12759	.13415	.13239	.13564	.13716	.13714	.14190	.13864	7
54	.12284	.13269	.12767	.13417	.13247	.13567	.13724	.13716	.14197	.13867	6
55	.12292	.13272	.12775	.13420	.13255	.13569	.13732	.13719	.14205	.13869	5
+ 14′	9.12300	.13274	9.12783	.13422	9.13263	.13571	9.13739	.13721	9.14213	.13872	4
57	.12308	.13276	.12791	.13425	.13271	.13574	.13747	.13724	.14221	.13874	3
58	.12316	.13279	.12799	.13427	.13279	.13576	.13755	.13726	.14229	.13877	2
59	.12324	.13281	.12807	.13430	.13287	.13579	.13763	.13729	.14237	.13879	1
+ 15′	9.12332	.13284	9.12815	.13432	9.13295	.13581	9.13771	.13731	9.14245	.13882	0
	$21^h\,9^m$		$21^h\,8^m$		$21^h\,7^m$		$21^h\,6^m$		$21^h\,5^m$		

TABLE 45.

Haversines.

	$2^h\,55^m$ 43° 45′		$2^h\,56^m$ 44° 0′		$2^h\,57^m$ 44° 15′		$2^h\,58^m$ 44° 30′		$2^h\,59^m$ 44° 45′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.14245	**.13882**	9.14715	**.14033**	9.15183	**.14185**	9.15647	**.14337**	9.16109	**.14491**	60
1	.14252	**.13884**	.14723	**.14035**	.15190	**.14187**	.15655	**.14340**	.16117	**.14493**	59
2	.14260	**.13887**	.14731	**.14038**	.15198	**.14190**	.15663	**.14343**	.16124	**.14496**	58
3	.14268	**.13889**	.14739	**.14041**	.15206	**.14192**	.15670	**.14345**	.16132	**.14498**	57
+ 1′	9.14276	**.13892**	9.14746	**.14043**	9.15214	**.14195**	9.15678	**.14348**	9.16140	**.14501**	56
5	.14284	**.13894**	.14754	**.14046**	.15321	**.14198**	.15686	**.14350**	.16147	**.14504**	55
6	.14292	**.13897**	.14762	**.14048**	.15329	**.14200**	.15694	**.14353**	.16155	**.14506**	54
7	.14300	**.13899**	.14770	**.14051**	.15237	**.14203**	.15701	**.14355**	.16163	**.14509**	53
+ 2′	9.14307	**.13902**	9.14778	**.14053**	9.15245	**.14205**	9.15709	**.14358**	9.16170	**.14511**	52
9	.14315	**.13904**	.14785	**.14056**	.15253	**.14208**	.15717	**.14360**	.16178	**.14514**	51
10	.14323	**.13907**	.14793	**.14058**	.15260	**.14210**	.15724	**.14363**	.16186	**.14516**	50
11	.14331	**.13909**	.14801	**.14061**	.15268	**.14213**	.15732	**.14366**	.16193	**.14519**	49
+ 3′	9.14339	**.13912**	9.14809	**.14063**	9.15276	**.14215**	9.15740	**.14368**	9.16201	**.14521**	48
13	.14347	**.13914**	.14817	**.14066**	.15284	**.14218**	.15748	**.14371**	.16209	**.14524**	47
14	.14355	**.13917**	.14824	**.14068**	.15291	**.14220**	.15755	**.14373**	.16216	**.14527**	46
15	.14362	**.13920**	.14832	**.14071**	.15299	**.14223**	.15763	**.14376**	.16224	**.14529**	45
+ 4′	9.14370	**.13922**	9.14840	**.14073**	9.15307	**.14226**	9.15771	**.14378**	9.16232	**.14532**	44
17	.14378	**.13925**	.14848	**.14076**	.15315	**.14228**	.15778	**.14381**	.16239	**.14534**	43
18	.14386	**.13927**	.14856	**.14079**	.15322	**.14231**	.15786	**.14383**	.16247	**.14537**	42
19	.14394	**.13930**	.14863	**.14081**	.15330	**.14233**	.15794	**.14386**	.16255	**.14539**	41
+ 5′	9.14402	**.13932**	9.14871	**.14084**	9.15338	**.14236**	9.15802	**.14388**	9.16262	**.14542**	40
21	.14410	**.13935**	.14879	**.14086**	.15346	**.14238**	.15809	**.14391**	.16270	**.14545**	39
22	.14417	**.13937**	.14887	**.14089**	.15353	**.14241**	.15817	**.14394**	.16278	**.14547**	38
23	.14425	**.13940**	.14895	**.14091**	.15361	**.14243**	.15825	**.14396**	.16285	**.14550**	37
+ 6′	9.14433	**.13942**	9.14902	**.14094**	9.15369	**.14246**	9.15832	**.14399**	9.16293	**.14552**	36
25	.14441	**.13945**	.14910	**.14096**	.15377	**.14248**	.15840	**.14401**	.16301	**.14555**	35
26	.14449	**.13947**	.14918	**.14099**	.15384	**.14251**	.15848	**.14404**	.16308	**.14557**	34
27	.14457	**.13950**	.14926	**.14101**	.15392	**.14253**	.15855	**.14406**	.16316	**.14560**	33
+ 7′	9.14465	**.13952**	9.14934	**.14104**	9.15400	**.14256**	9.15863	**.14409**	9.16324	**.14562**	32
29	.14472	**.13955**	.14941	**.14106**	.15408	**.14259**	.15871	**.14411**	.16331	**.14565**	31
30	.14480	**.13957**	.14949	**.14109**	.15415	**.14261**	.15879	**.14414**	.16339	**.14568**	30
31	.14488	**.13960**	.14957	**.14111**	.15423	**.14264**	.15886	**.14417**	.16346	**.14570**	29
+ 8′	9.14496	**.13962**	9.14965	**.14114**	9.15431	**.14266**	9.15894	**.14419**	9.16354	**.14573**	28
33	.14504	**.13965**	.14973	**.14116**	.15439	**.14269**	.15902	**.14422**	.16362	**.14575**	27
34	.14512	**.13967**	.14980	**.14119**	.15446	**.14271**	.15909	**.14424**	.16369	**.14578**	26
35	.14519	**.13970**	.14988	**.14122**	.15454	**.14274**	.15917	**.14427**	.16377	**.14580**	25
+ 9′	9.14527	**.13972**	9.14996	**.14124**	9.15462	**.14276**	9.15925	**.14429**	9.16385	**.14583**	24
37	.14535	**.13975**	.15004	**.14127**	.15470	**.14279**	.15932	**.14432**	.16392	**.14586**	23
38	.14543	**.13977**	.15012	**.14129**	.15477	**.14281**	.15940	**.14434**	.16400	**.14588**	22
39	.14551	**.13980**	.15019	**.14132**	.15485	**.14284**	.15948	**.14437**	.16408	**.14591**	21
+ 10′	9.14559	**.13983**	9.15027	**.14134**	9.15493	**.14287**	9.15955	**.14440**	9.16415	**.14593**	20
41	.14566	**.13985**	.15035	**.14137**	.15500	**.14289**	.15963	**.14442**	.16423	**.14596**	19
42	.14574	**.13988**	.15043	**.14130**	.15508	**.14292**	.15971	**.14445**	.16431	**.14598**	18
43	.14582	**.13990**	.15050	**.14142**	.15516	**.14294**	.15978	**.14447**	.16438	**.14601**	17
+ 11′	9.14590	**.13993**	9.15058	**.14144**	9.15524	**.14297**	9.15986	**.14450**	9.16446	**.14604**	16
45	.14598	**.13995**	.15066	**.14147**	.15531	**.14299**	.15994	**.14452**	.16453	**.14606**	15
46	.14606	**.13998**	.15074	**.14149**	.15539	**.14302**	.16002	**.14455**	.16461	**.14609**	14
47	.14613	**.14000**	.15082	**.14152**	.15547	**.14304**	.16009	**.14457**	.16469	**.14611**	13
+ 12′	9.14621	**.14003**	9.15089	**.14154**	9.15555	**.14307**	9.16017	**.14460**	9.16476	**.14614**	12
49	.14629	**.14005**	.15097	**.14157**	.15562	**.14309**	.16025	**.14463**	.16484	**.14616**	11
50	.14637	**.14008**	.15105	**.14160**	.15570	**.14312**	.16032	**.14465**	.16492	**.14619**	10
51	.14645	**.14010**	.15113	**.14162**	.15578	**.14315**	.16040	**.14468**	.16499	**.14622**	9
+ 13′	9.14653	**.14013**	9.15120	**.14165**	9.15585	**.14317**	9.16048	**.14470**	9.16507	**.14624**	8
53	.14660	**.14015**	.15128	**.14167**	.15593	**.14320**	.16055	**.14473**	.16515	**.14627**	7
54	.14668	**.14018**	.15136	**.14170**	.15601	**.14322**	.16063	**.14475**	.16522	**.14629**	6
55	.14676	**.14020**	.15144	**.14172**	.15609	**.14325**	.16071	**.14478**	.16530	**.14632**	5
+ 14′	9.14684	**.14023**	9.15152	**.14175**	9.15616	**.14327**	9.16078	**.14480**	9.16537	**.14634**	4
57	.14692	**.14025**	.15159	**.14177**	.15624	**.14330**	.16086	**.14483**	.16545	**.14637**	3
58	.14699	**.14028**	.15167	**.14180**	.15632	**.14332**	.16094	**.14486**	.16553	**.14639**	2
59	.14707	**.14030**	.15175	**.14182**	.15640	**.14335**	.16101	**.14488**	.16560	**.14642**	1
+ 15′	9.14715	**.14033**	9.15183	**.14185**	9.15647	**.14337**	9.16109	**.14491**	9.16568	**.14645**	0
	$21^h\,4^m$		$21^h\,3^m$		$21^h\,2^m$		$21^h\,1^m$		$21^h\,0^m$		

TABLE 45.

Haversines.

	$3^h\,0^m$ **45° 0′**		$3^h\,1^m$ **45° 15′**		$3^h\,2^m$ **45° 30′**		$3^h\,3^m$ **45° 45′**		$3^h\,4^m$ **46° 0′**		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.16568	**.14645**	9.17024	**.14799**	9.17477	**.14955**	9.17928	**.15110**	9.18376	**.15267**	60
1	.16576	**.14647**	.17032	**.14802**	.17485	**.14957**	.17935	**.15113**	.18383	**.15270**	59
2	.16583	**.14650**	.17039	**.14804**	.17492	**.14960**	.17943	**.15116**	.18390	**.15272**	58
3	.16591	**.14652**	.17047	**.14807**	.17500	**.14962**	.17950	**.15118**	.18398	**.15275**	57
+ **1′**	9.16598	**.14655**	9.17054	**.14810**	9.17507	**.14965**	9.17958	**.15121**	9.18405	**.15278**	56
5	.16606	**.14658**	.17062	**.14812**	.17515	**.14968**	.17965	**.15123**	.18413	**.15280**	55
6	.16614	**.14660**	.17069	**.14815**	.17522	**.14970**	.17973	**.15126**	.18420	**.15283**	54
7	.16621	**.14663**	.17077	**.14817**	.17530	**.14973**	.17980	**.15129**	.18428	**.15285**	53
+ **2′**	9.16629	**.14665**	9.17085	**.14820**	9.17538	**.14975**	9.17988	**.15131**	9.18435	**.15288**	52
9	.16637	**.14668**	.17092	**.14822**	.17545	**.14978**	.17995	**.15134**	.18443	**.15291**	51
10	.16644	**.14670**	.17100	**.14825**	.17553	**.14981**	.18003	**.15137**	.18450	**.15293**	50
11	.16652	**.14673**	.17107	**.14828**	.17560	**.14983**	.18010	**.15139**	.18457	**.15296**	49
+ **3′**	9.16659	**.14676**	9.17115	**.14830**	9.17568	**.14986**	9.18018	**.15142**	9.18465	**.15298**	48
13	.16667	**.14678**	.17122	**.14833**	.17575	**.14988**	.18025	**.15144**	.18472	**.15301**	47
14	.16675	**.14681**	.17130	**.14835**	.17583	**.14991**	.18033	**.15147**	.18480	**.15304**	46
15	.16682	**.14683**	.17138	**.14838**	.17590	**.14993**	.18040	**.15150**	.18487	**.15306**	45
+ **4′**	9.16690	**.14686**	9.17145	**.14841**	9.17598	**.14996**	9.18048	**.15152**	9.18495	**.15309**	44
17	.16697	**.14688**	.17153	**.14843**	.17605	**.14999**	.18055	**.15155**	.18502	**.15312**	43
18	.16705	**.14691**	.17160	**.14846**	.17613	**.15001**	.18062	**.15157**	.18509	**.15314**	42
19	.16713	**.14693**	.17168	**.14848**	.17620	**.15004**	.18070	**.15160**	.18517	**.15316**	41
+ **5′**	9.16720	**.14696**	9.17175	**.14851**	9.17628	**.15006**	9.18077	**.15163**	9.18524	**.15319**	40
21	.16728	**.14699**	.17183	**.14853**	.17635	**.15009**	.18085	**.15165**	.18532	**.15322**	39
22	.16735	**.14701**	.17191	**.14856**	.17643	**.15012**	.18092	**.15168**	.18539	**.15325**	38
23	.16743	**.14704**	.17198	**.14859**	.17650	**.15014**	.18100	**.15170**	.18547	**.15327**	37
+ **6′**	9.16751	**.14706**	9.17206	**.14861**	9.17658	**.15017**	9.18107	**.15173**	9.18554	**.15330**	36
25	.16758	**.14709**	.17213	**.14864**	.17665	**.15019**	.18115	**.15176**	.18561	**.15333**	35
26	.16766	**.14712**	.17221	**.14866**	.17673	**.15022**	.18122	**.15178**	.18569	**.15335**	34
27	.16774	**.14714**	.17228	**.14869**	.17680	**.15025**	.18130	**.15181**	.18576	**.15337**	33
+ **7′**	9.16781	**.14717**	9.17236	**.14872**	9.17688	**.15027**	9.18137	**.15183**	9.18584	**.15340**	32
29	.16789	**.14719**	.17243	**.14874**	.17695	**.15030**	.18145	**.15186**	.18591	**.15343**	31
30	.16796	**.14722**	.17251	**.14877**	.17703	**.15032**	.18152	**.15189**	.18598	**.15340**	30
31	.16804	**.14724**	.17259	**.14879**	.17710	**.15035**	.18160	**.15191**	.18606	**.15348**	29
+ **8′**	9.16812	**.14727**	9.17266	**.14882**	9.17718	**.15038**	9.18167	**.15194**	9.18613	**.15351**	28
33	.16819	**.14730**	.17274	**.14885**	.17725	**.15040**	.18174	**.15197**	.18621	**.15353**	27
34	.16827	**.14732**	.17281	**.14887**	.17733	**.15043**	.18182	**.15199**	.18628	**.15356**	26
35	.16834	**.14735**	.17289	**.14890**	.17740	**.15045**	.18189	**.15202**	.18636	**.15359**	25
+ **9′**	9.16842	**.14737**	9.17296	**.14892**	9.17748	**.15048**	9.18197	**.15204**	9.18643	**.15361**	24
37	.16850	**.14740**	.17304	**.14895**	.17755	**.15051**	.18204	**.15207**	.18650	**.15364**	23
38	.16857	**.14743**	.17311	**.14898**	.17763	**.15053**	.18212	**.15210**	.18658	**.15367**	22
39	.16865	**.14745**	.17319	**.14900**	.17770	**.15056**	.18219	**.15212**	.18665	**.15369**	21
+ **10′**	9.16872	**.14748**	9.17327	**.14903**	9.17778	**.15058**	9.18227	**.15215**	9.18673	**.15372**	20
41	.16880	**.14750**	.17334	**.14905**	.17785	**.15061**	.18234	**.15217**	.18680	**.15374**	19
42	.16887	**.14753**	.17342	**.14908**	.17793	**.15064**	.18242	**.15220**	.18687	**.15377**	18
43	.16895	**.14755**	.17349	**.14910**	.17800	**.15066**	.18249	**.15222**	.18695	**.15379**	17
+ **11′**	9.16903	**.14758**	9.17357	**.14913**	9.17808	**.15069**	9.18256	**.15225**	9.18702	**.15382**	16
45	.16910	**.14760**	.17364	**.14916**	.17815	**.15071**	.18264	**.15228**	.18710	**.15385**	15
46	.16918	**.14763**	.17372	**.14918**	.17823	**.15074**	.18271	**.15230**	.18717	**.15388**	14
47	.16925	**.14766**	.17379	**.14921**	.17830	**.15077**	.18279	**.15233**	.18724	**.15390**	13
+ **12′**	9.16933	**.14768**	9.17387	**.14923**	9.17838	**.15079**	9.18286	**.15236**	9.18732	**.15393**	12
49	.16941	**.14771**	.17394	**.14926**	.17845	**.15082**	.18294	**.15238**	.18739	**.15395**	11
50	.16948	**.14773**	.17402	**.14929**	.17853	**.15084**	.18301	**.15241**	.18747	**.15398**	10
51	.16956	**.14776**	.17409	**.14931**	.17860	**.15087**	.18309	**.15244**	.18754	**.15401**	9
+ **13′**	9.16963	**.14779**	9.17417	**.14934**	9.17868	**.15090**	9.18316	**.15246**	9.18762	**.15403**	8
53	.16971	**.14781**	.17425	**.14936**	.17875	**.15092**	.18324	**.15249**	.18769	**.15406**	7
54	.16979	**.14784**	.17432	**.14939**	.17883	**.15095**	.18331	**.15251**	.18776	**.15409**	6
55	.16986	**.14786**	.17440	**.14942**	.17890	**.15097**	.18338	**.15254**	.18784	**.15411**	5
+ **14′**	9.16994	**.14789**	9.17447	**.14944**	9.17898	**.15100**	9.18346	**.15257**	9.18791	**.15414**	4
57	.17001	**.14791**	.17455	**.14947**	.17905	**.15103**	.18353	**.15259**	.18798	**.15416**	3
58	.17009	**.14794**	.17462	**.14949**	.17913	**.15105**	.18361	**.15262**	.18806	**.15419**	2
59	.17016	**.14797**	.17470	**.14952**	.17920	**.15108**	.18368	**.15264**	.18813	**.15422**	1
+ **15′**	9.17024	**.14799**	9.17477	**.14955**	9.17928	**.15110**	9.18376	**.15267**	9.18821	**.15424**	0
	$20^h\,59^m$		$20^h\,58^m$		$20^h\,57^m$		$20^h\,56^m$		$20^h\,55^m$		

TABLE 45.

Haversines.

	$3^h 5^m$ 46° 15′		$3^h 6^m$ 46° 30′		$3^h 7^m$ 46° 45′		$3^h 8^m$ 47° 0′		$3^h 9^m$ 47° 15′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.18821	.15424	9.19263	.15582	9.19703	.15741	9.20140	.15900	9.20574	.16060	60
1	.18828	.15427	.19270	.15585	.19710	.15743	.20147	.15903	.20582	.16063	59
2	.18835	.15430	.19278	.15588	.19717	.15746	.20154	.15905	.20589	.16065	58
3	.18843	.15432	.19285	.15590	.19725	.15748	.20162	.15908	.20596	.16068	57
+ 1′	9.18850	.15435	9.19292	.15593	9.19732	.15751	9.20169	.15911	9.20603	.16071	56
5	.18858	.15437	.19300	.15595	.19739	.15754	.20176	.15913	.20611	.16073	55
6	.18865	.15440	.19307	.15598	.19747	.15757	.20184	.15916	.20618	.16076	54
7	.18872	.15443	.19315	.15601	.19754	.15759	.20191	.15919	.20625	.16079	53
+ 2′	9.18880	.15445	9.19322	.15603	9.19761	.15762	9.20198	.15921	9.20632	.16081	52
9	.18887	.15448	.19329	.15606	.19769	.15765	.20205	.15924	.20639	.16084	51
10	.18895	.15451	.19337	.15609	.19776	.15767	.20213	.15927	.20647	.16087	50
11	.18902	.15453	.19344	.15611	.19783	.15770	.20220	.15929	.20654	.16089	49
+ 3′	9.18909	.15456	9.19351	.15614	9.19790	.15773	9.20227	.15932	9.20661	.16092	48
13	.18917	.15458	.19359	.15617	.19798	.15775	.20234	.15935	.20668	.16095	47
14	.18924	.15461	.19366	.15619	.19805	.15778	.20242	.15937	.20675	.16097	46
15	.18932	.15464	.19373	.15622	.19812	.15781	.20249	.15940	.20683	.16100	45
+ 4′	9.18939	.15466	9.19381	.15625	9.19820	.15783	9.20256	.15943	9.20690	.16103	44
17	.18946	.15469	.19388	.15627	.19827	.15786	.20263	.15945	.20697	.16105	43
18	.18954	.15472	.19395	.15630	.19834	.15789	.20271	.15948	.20704	.16108	42
19	.18961	.15474	.19403	.15632	.19842	.15791	.20278	.15951	.20712	.16111	41
+ 5′	9.18968	.15477	9.19410	.15635	9.19849	.15794	9.20285	.15953	9.20719	.16113	40
21	.18976	.15479	.19417	.15638	.19856	.15796	.20292	.15956	.20726	.16116	39
22	.18983	.15482	.19425	.15640	.19863	.15799	.20300	.15959	.20733	.16119	38
23	.18991	.15485	.19432	.15643	.19871	.15802	.20307	.15961	.20740	.16121	37
+ 6′	9.18998	.15487	9.19439	.15646	9.19878	.15804	9.20314	.15964	9.20748	.16124	36
25	.19005	.15490	.19447	.15648	.19885	.15807	.20321	.15967	.20755	.16127	35
26	.19013	.15493	.19454	.15651	.19893	.15810	.20329	.15969	.20762	.16129	34
27	.19020	.15495	.19461	.15654	.19900	.15812	.20336	.15972	.20769	.16132	33
+ 7′	9.19027	.15498	9.19469	.15656	9.19907	.15815	9.20343	.15975	9.20776	.16135	32
29	.19035	.15501	.19476	.15659	.19914	.15818	.20350	.15977	.20784	.16137	31
30	.19042	.15503	.19483	.15662	.19922	.15820	.20358	.15980	.20791	.16140	30
31	.19050	.15506	.19491	.15664	.19929	.15823	.20365	.15983	.20798	.16143	29
+ 8′	9.19057	.15509	9.19498	.15667	9.19936	.15826	9.20372	.15985	9.20805	.16146	28
33	.19064	.15511	.19505	.15670	.19944	.15828	.20379	.15988	.20812	.16148	27
34	.19072	.15514	.19513	.15672	.19951	.15831	.20386	.15991	.20820	.16151	26
35	.19079	.15516	.19520	.15675	.19958	.15834	.20394	.15903	.20827	.16154	25
+ 9′	9.19086	.15519	9.19527	.15677	9.19965	.15836	9.20401	.15996	9.20834	.16156	24
37	.19094	.15522	.19535	.15680	.19973	.15839	.20408	.15999	.20841	.16159	23
38	.19101	.15524	.19542	.15683	.19980	.15842	.20415	.16001	.20848	.16162	22
39	.19109	.15527	.19549	.15685	.19987	.15844	.20423	.16004	.20856	.16164	21
+ 10′	9.19116	.15530	9.19557	.15688	9.19995	.15847	9.20430	.16007	9.20863	.16167	20
41	.19123	.15532	.19564	.15691	.20002	.15850	.20437	.16009	.20870	.16170	19
42	.19131	.15535	.19571	.15693	.20009	.15852	.20444	.16012	.20877	.16172	18
43	.19138	.15537	.19579	.15696	.20016	.15855	.20452	.16015	.20884	.16175	17
+ 11′	9.19145	.15540	9.19586	.15699	9.20024	.15858	9.20459	.16017	9.20891	.16178	16
45	.19153	.15543	.19593	.15701	.20031	.15860	.20466	.16020	.20899	.16180	15
46	.19160	.15545	.19600	.15704	.20038	.15863	.20473	.16023	.20906	.16183	14
47	.19167	.15548	.19608	.15706	.20045	.15866	.20481	.16025	.20913	.16186	13
+ 12′	9.19175	.15551	9.19615	.15709	9.20053	.15868	9.20488	.16028	9.20920	.16188	12
49	.19182	.15553	.19622	.15712	.20060	.15871	.20495	.16031	.20927	.16191	11
50	.19190	.15556	.19630	.15714	.20067	.15874	.20502	.16033	.20935	.16194	10
51	.19197	.15559	.19637	.15717	.20075	.15876	.20509	.16036	.20942	.16196	9
+ 13′	9.19204	.15561	9.19644	.15720	9.20082	.15879	9.20517	.16039	9.20949	.16199	8
53	.19212	.15564	.19652	.15722	.20089	.15881	.20524	.16041	.20956	.16202	7
54	.19219	.15506	.19659	.15725	.20096	.15884	.20531	.16044	.20963	.16204	6
55	.19226	.15569	.19666	.15728	.20104	.15887	.20538	.16047	.20971	.16207	5
+ 14′	9.19234	.15572	9.19674	.15730	9.20111	.15889	9.20546	.16049	9.20978	.16210	4
57	.19241	.15574	.19681	.15733	.20118	.15892	.20553	.16052	.20985	.16212	3
58	.19248	.15577	.19688	.15736	.20125	.15895	.20560	.16055	.20992	.16215	2
59	.19256	.15580	.19696	.15738	.20133	.15898	.20567	.16657	.20999	.16218	1
+ 15′	9.19263	.15582	9.19703	.15741	9.20140	.15900	9.20574	.16060	9.21006	.16220	0
	$20^h 54^m$		$20^h 53^m$		$20^h 52^m$		$20^h 51^m$		$20^h 50^m$		

TABLE 45.

Haversines.

	3h 10m 47° 30′		*3h 11m* 47° 45′		*3h 12m* 48° 0′		*3h 13m* 48° 15′		*3h 14m* 48° 30′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.21006	.16220	9.21436	.16382	9.21863	.16543	9.22287	.16706	9.22709	.16869	60
1	.21014	.16223	.21443	.16384	.21870	.16546	.22294	.16709	.22716	.16872	59
2	.21021	.16226	.21450	.16387	.21877	.16549	.22301	.16711	.22723	.16874	58
3	.21028	.16229	.21457	.16390	.21884	.16552	.22308	.16714	.22730	.16877	57
+ 1′	9.21035	.16231	9.21464	.16392	9.21891	.16554	9.22315	.16717	9.22737	.16880	56
5	.21042	.16234	.21471	.16395	.21898	.16557	.22322	.16720	.22744	.16883	55
6	.21049	.16237	.21479	.16398	.21905	.16560	.22329	.16722	.22751	.16885	54
7	.21057	.16239	.21486	.16401	.21912	.16562	.22336	.16725	.22758	.16888	53
+ 2′	9.21064	.16242	9.21493	.16403	9.21919	.16565	9.22343	.16728	9.22765	.16891	52
9	.21071	.16245	.21500	.16406	.21926	.16568	.22350	.16730	.22772	.16893	51
10	.21078	.16247	.21507	.16409	.21934	.16571	.22358	.16733	.22779	.16896	50
11	.21085	.16250	.21514	.16411	.21941	.16573	.22365	.16736	.22786	.16899	49
+ 3′	9.21092	.16253	9.21521	.16414	9.21948	.16576	9.22372	.16738	9.22793	.16902	48
13	.21100	.16255	.21529	.16417	.21955	.16579	.22379	.16741	.22800	.16904	47
14	.21107	.16258	.21536	.16419	.21962	.16581	.22386	.16744	.22807	.16907	46
15	.21114	.16261	.21543	.16422	.21969	.16584	.22393	.16747	.22814	.16910	45
+ 4′	9.21121	.16263	9.21550	.16425	9.21976	.16587	9.22400	.16749	9.22821	.16913	44
17	.21128	.16266	.21557	.16427	.21983	.16589	.22407	.16752	.22828	.16915	43
18	.21135	.16269	.21564	.16430	.21990	.16592	.22414	.16755	.22835	.16918	42
19	.21143	.16271	.21571	.16433	.21997	.16595	.22421	.16757	.22842	.16921	41
+ 5′	9.21150	.16274	9.21578	.16436	9.22004	.16598	9.22428	.16760	9.22849	.16924	40
21	.21157	.16277	.21585	.16438	.22011	.16600	.22435	.16763	.22856	.16926	39
22	.21164	.16280	.21593	.16441	.22019	.16603	.22442	.16766	.22863	.16929	38
23	.21171	.16282	.21600	.16444	.22026	.16606	.22449	.16768	.22870	.16932	37
+ 6′	9.21178	.16285	9.21607	.16446	9.22033	.16608	9.22456	.16771	9.22877	.16934	36
25	.21186	.16288	.21614	.16449	.22040	.16611	.22463	.16774	.22884	.16937	35
26	.21193	.16290	.21621	.16452	.22047	.16614	.22470	.16777	.22891	.16940	34
27	.21200	.16293	.21628	.16454	.22054	.16616	.22477	.16779	.22898	.16943	33
+ 7′	9 21207	.16296	9.21635	.16457	9.22061	.16619	9.22484	.16782	9.22905	.16945	32
29	.21214	.16298	.21642	.16460	.22068	.16622	.22491	.16785	.22912	.16948	31
30	.21221	.16301	.21650	.16462	.22075	.16625	.22498	.16787	.22919	.16951	30
31	.21229	.16304	.21657	.16465	.22082	.16627	.22505	.16790	.22926	.16953	29
+ 8′	9.21236	.16306	9.21664	.16468	9.22089	.16630	9.22512	.16793	9.22933	.16956	28
33	.21243	.16309	.21671	.16471	.22096	.16633	.22519	.16795	.22940	.16959	27
34	.21250	.16312	.21678	.16473	.22103	.16635	.22526	.16798	.22947	.16962	26
35	.21257	.16314	.21685	.16476	.22111	.16638	.22533	.16801	.22954	.16964	25
+ 9′	9.21264	.16317	9.21692	.16479	9.22118	.16641	9.22540	.16804	9.22961	.16967	24
37	.21272	.16320	.21699	.16481	.22125	.16044	.22547	.16806	.22968	.16970	23
38	.21279	.16323	.21706	.16484	.22132	.16646	.22555	.16809	.22975	.16973	22
39	.21286	.16325	.21714	.16487	.22139	.16649	.22362	.16812	.22982	.16975	21
+ 10′	9.21293	.16328	9.21721	.16489	9.22146	.16652	9.22569	.16815	9.22989	.16978	20
41	.21300	.16331	.21728	.16492	.22153	.16654	.22576	.16817	.22996	.16981	19
42	.21307	.16333	.21735	.16495	.22160	.16657	.22583	.16820	.23003	.16984	18
43	.21314	.16336	.21742	.16498	.22167	.16660	.22590	.16823	.23010	.16986	17
+ 11′	9.21322	.16339	9.21749	.16500	9.22174	.16663	9.22597	.16825	9.23017	.16989	16
45	.21329	.16341	.21756	.16503	.22181	.16665	.22604	.16828	.23024	.16992	15
46	.21336	.16344	.21763	.16506	.22188	.16668	.22611	.16831	.23031	.16994	14
47	.21343	.16347	.21770	.16508	.22195	.16671	.22618	.16834	.23038	.16997	13
+ 12′	9.21350	.16349	9.21778	.16511	9.22202	.16673	9.22625	.16836	9.23045	.17000	12
49	.21357	.16352	.21785	.16514	.22209	.16676	.22632	.16839	.23052	.17003	11
50	.21364	.16355	.21792	.16516	.22216	.16679	.22639	.16842	.23059	.17005	10
51	.21372	.16357	.21799	.16519	.22224	.16681	.22646	.16844	.23066	.17008	9
+ 13′	9.21379	.16360	9.21806	.16522	9.22231	.16684	9.22653	.16847	9.23073	.17011	8
53	.21386	.16363	.21813	.16524	.22238	.16687	.22660	.16850	.23080	.17014	7
54	.21393	.16366	.21820	.16527	.22245	.16690	.22667	.16853	.23087	.17016	6
55	.21400	.16368	.21827	.16530	.22252	.16692	.22674	.16855	.23094	.17019	5
+ 14′	9.21407	.16371	9.21834	.16533	9.22259	.16695	9.22681	.16858	9.23100	.17022	4
57	.21414	.16374	.21841	.16535	.22266	.16698	.22688	.16861	.23107	.17024	3
58	.21422	.16376	.21848	.16538	.22273	.16701	.22695	.16864	.23114	.17027	2
59	.21429	.16379	.21856	.16541	.22280	.16703	.22702	.16866	.23121	.17030	1
+ 15′	9.21436	.16382	9.21863	.16543	9.22287	.16706	9.22709	.16869	9.23128	.17033	0
	20h 49m		*20h 48m*		*20h 47m*		*20h 46m*		*20h 45m*		

TABLE 45.

Haversines.

	$3^h\ 15^m$ 48° 45′		$3^h\ 16^m$ 49° 0′		$3^h\ 17^m$ 49° 15′		$3^h\ 18^m$ 49° 30′		$3^h\ 19^m$ 49° 45′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.23128	.17033	9.23545	.17197	9.23960	.17362	9.24372	.17528	9.24782	.17694	60
1	.23135	.17035	.23552	.17200	.23967	.17365	.24379	.17530	.24789	.17697	59
2	.23142	.17038	.23559	.17203	.23974	.17368	.24386	.17533	.24796	.17699	58
3	.23149	.17041	.23566	.17205	.23981	.17370	.24393	.17536	.24803	.17702	57
+ 1′	9.23156	.17044	9.23573	.17208	9.23988	.17373	9.24400	.17539	9.24809	.17705	56
5	.23163	.17046	.23580	.17211	.23994	.17376	.24406	.17541	.24816	.17708	55
6	.23170	.17049	.23587	.17214	.24001	.17379	.24413	.17544	.24823	.17710	54
7	.23177	.17052	.23594	.17216	.24008	.17381	.24420	.17547	.24830	.17713	53
+ 2′	9.23184	.17055	9.23601	.17219	9.24015	.17384	9.24427	.17550	9.24837	.17716	52
9	.23191	.17057	.23608	.17222	.24022	.17387	.24434	.17552	.24843	.17719	51
10	.23198	.17060	.23615	.17225	.24029	.17390	.24441	.17555	.24850	.17722	50
11	.23205	.17063	.23622	.17227	.24036	.17392	.24448	.17558	.24857	.17724	49
+ 3′	9.23212	.17066	9.23629	.17230	9.24043	.17395	9.24454	.17561	9.24864	.17727	48
13	.23219	.17068	.23635	.17233	.24050	.17398	.24461	.17563	.24871	.17730	47
14	.23226	.17071	.23642	.17235	.24056	.17401	.24468	.17566	.24877	.17733	46
15	.23233	.17074	.23649	.17238	.24063	.17403	.24475	.17569	.24884	.17735	45
+ 4′	9.23240	.17076	9.23656	.17241	9.24070	.17406	9.24482	.17572	9.24891	.17738	44
17	.23247	.17079	.23663	.17244	.24077	.17409	.24489	.17575	.24898	.17741	43
18	.23254	.17082	.23670	.17246	.24084	.17412	.24495	.17577	.24905	.17744	42
19	.23261	.17085	.23677	.17249	.24091	.17414	.24502	.17580	.24911	.17746	41
+ 5′	9.23268	.17087	9.23684	.17252	9.24098	.17417	9.24509	.17583	9.24918	.17749	40
21	.23275	.17090	.23691	.17255	.24105	.17420	.24516	.17586	.24925	.17752	39
22	.23282	.17093	.23698	.17257	.24111	.17423	.24523	.17588	.24932	.17755	38
23	.23289	.17096	.23705	.17260	.24118	.17425	.24530	.17591	.24939	.17758	37
+ 6′	9.23295	.17098	9.23712	.17263	9.24125	.17428	9.24536	.17594	9.24945	.17760	36
25	.23302	.17101	.23718	.17266	.24132	.17431	.24543	.17597	.24952	.17763	35
26	.23309	.17104	.23725	.17268	.24139	.17434	.24550	.17600	.24959	.17766	34
27	.23316	.17107	.23732	.17271	.24146	.17436	.24557	.17602	.24966	.17769	33
+ 7′	9.23323	.17109	9.23739	.17274	9.24153	.17439	9.24564	.17605	9.24973	.17772	32
29	.23330	.17112	.23746	.17277	.24160	.17442	.24571	.17608	.24979	.17774	31
30	.23337	.17115	.23753	.17279	.24166	.17445	.24577	.17611	.24986	.17777	30
31	.23344	.17117	.23760	.17282	.24173	.17447	.24584	.17613	.24993	.17780	29
+ 8′	9.23351	.17120	9.23767	.17285	9.24180	.17450	9.24591	.17616	9.25000	.17783	28
33	.23358	.17123	.23774	.17288	.24187	.17453	.24598	.17619	.25007	.17785	27
34	.23365	.17126	.23781	.17290	.24194	.17456	.24605	.17622	.25013	.17788	26
35	.23372	.17128	.23788	.17293	.24201	.17458	.24612	.17624	.25020	.17791	25
+ 9′	9.23379	.17131	9.23794	.17296	9.24208	.17461	9.24618	.17627	9.25027	.17794	24
37	.23386	.17134	.23801	.17299	.24215	.17464	.24625	.17630	.25034	.17797	23
38	.23393	.17137	.23808	.17301	.24221	.17467	.24632	.17633	.25040	.17799	22
39	.23400	.17139	.23815	.17304	.24228	.17470	.24639	.17636	.25047	.17802	21
+ 10′	9.23407	.17142	9.23822	.17307	9.24235	.17472	9.24646	.17638	9.25054	.17805	20
41	.23414	.17145	.23829	.17310	.24242	.17475	.24653	.17641	.25061	.17808	19
42	.23421	.17148	.23836	.17313	.24249	.17478	.24659	.17644	.25068	.17811	18
43	.23427	.17150	.23843	.17315	.24256	.17481	.24666	.17647	.25074	.17813	17
+ 11′	9.23434	.17153	9.23850	.17318	9.24263	.17483	9.24673	.17649	9.25081	.17816	16
45	.23441	.17156	.23857	.17321	.24269	.17486	.24680	.17652	.25088	.17819	15
46	.23448	.17159	.23863	.17323	.24276	.17489	.24687	.17655	.25095	.17822	14
47	.23455	.17161	.23870	.17326	.24283	.17492	.24694	.17658	.25102	.17824	13
+ 12′	9.23462	.17164	9.23877	.17329	9.24290	.17494	9.24700	.17661	9.25108	.17827	12
49	.23469	.17167	.23884	.17332	.24297	.17497	.24707	.17663	.25115	.17830	11
50	.23476	.17170	.23891	.17335	.24304	.17500	.24714	.17066	.25122	.17833	10
51	.23483	.17172	.23898	.17337	.24311	.17503	.24721	.17669	.25129	.17836	9
+ 13′	9.23490	.17175	9.23905	.17340	9.24317	.17505	9.24728	.17672	9.25135	.17838	8
53	.23497	.17178	.23912	.17343	.24324	.17508	.24734	.17674	.25142	.17841	7
54	.23504	.17181	.23919	.17346	.24331	.17511	.24741	.17677	.25149	.17844	6
55	.23511	.17183	.23926	.17348	.24338	.17514	.24748	.17680	.25156	.17847	5
+ 14′	9.23518	.17186	9.23932	.17351	9.24345	.17517	9.24755	.17683	9.25163	.17849	4
57	.23525	.17189	.23939	.17354	.24352	.17519	.24762	.17686	.25169	.17852	3
58	.23532	.17192	.23946	.17357	.24359	.17522	.24768	.17688	.25176	.17855	2
59	.23538	.17194	.23953	.17359	.24365	.17525	.24775	.17691	.25183	.17858	1
+ 15′	9.23545	.17197	9.23960	.17362	9.24372	.17528	9.24782	.17694	9.25190	.17861	0
	$20^h\ 44^m$		$20^h\ 43^m$		$20^h\ 42^m$		$20^h\ 41^m$		$20^h\ 40^m$		

TABLE 45.

Haversines.

	$3^h\ 20^m$ 50° 0′		$3^h\ 21^m$ 50° 15′		$3^h\ 22^m$ 50° 30′		$3^h\ 23^m$ 50° 45′		-$3^h\ 24^m$ 51° 0′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.25190	.17861	9.25595	.18028	9.25998	.18196	9.26398	.18365	9.26797	.18534	60
1	.25196	.17863	.25602	.18031	.26005	.18190	.26405	.18368	.26804	.18537	59
2	.25203	.17866	.25608	.18034	.26011	.18202	.26412	.18370	.26810	.18540	58
3	.25210	.17869	.25615	.18036	.26018	.18205	.26418	.18373	.26817	.18542	57
+ 1′	9.25217	.17872	9.25622	.18039	9.26025	.18207	9.26425	.18376	9.26823	.18545	56
5	.25224	.17875	.25629	.18042	.26031	.18210	.26432	.18379	.26830	.18548	55
6	.25230	.17877	.25635	.18045	.26038	.18213	.26438	.18382	.26837	.18551	54
7	.25237	.17880	.25642	.18048	.26045	.18216	.26445	.18384	.26843	.18554	53
+ 2′	9.25244	.17883	9.25649	.18050	9.26051	.18219	9.26452	.18387	9.26850	.18557	52
9	.25251	.17886	.25655	.18053	.26058	.18221	.26458	.18390	.26856	.18559	51
10	.25257	.17888	.25662	.18056	.26065	.18224	.26465	.18393	.26863	.18562	50
11	.25264	.17891	.25669	.18059	.26071	.18227	.26472	.18390	.26870	.18565	49
+ 3′	9.25271	.17894	9.25676	.18062	9.26078	.18230	9.26478	.18390	9.26876	.18568	48
13	.25278	.17897	.25682	.18064	.26085	.18233	.26485	.18401	.26883	.18571	47
14	.25284	.17900	.25689	.18067	.26091	.18235	.26492	.18404	.26890	.18574	46
15	.25291	.17902	.25696	.18070	.26098	.18238	.26498	.18407	.26896	.18576	45
+ 4′	9.25298	.17905	9.25703	.18073	9.26105	.18241	9.26505	.18410	9.26903	.18579	44
17	.25305	.17908	.25709	.18076	.26112	.18244	.26512	.18413	.26909	.18582	43
18	.25311	.17911	.25716	.18078	.26118	.18247	.26518	.18415	.26916	.18585	42
19	.25318	.17914	.25723	.18081	.26125	.18249	.26525	.18418	.26923	.18588	41
+ 5′	9.25325	.17916	9.25729	.18084	9.26132	.18252	9.26532	.18421	9.26929	.18591	40
21	.25332	.17919	.25736	.18087	.26138	.18255	.26538	.18424	.26936	.18593	39
22	.25339	.17922	.25743	.18090	.26145	.18258	.26545	.18427	.26942	.18596	38
23	.25345	.17925	.25750	.18092	.26152	.18261	.26551	.18430	.26949	.18599	37
+ 6′	9.25352	.17928	9.25756	.18095	9.26158	.18263	9.26558	.18432	9.26956	.18602	36
25	.25359	.17930	.25763	.18098	.26165	.18266	.26565	.18435	.26962	.18605	35
26	.25366	.17933	.25770	.18101	.26172	.18269	.26571	.18438	.26969	.18608	34
27	.25372	.17936	.25776	.18104	.26178	.18272	.26578	.18441	.26975	.18610	33
+ 7′	9.25379	.17939	9.25783	.18106	9.26185	.18275	9.26585	.18444	9.26982	.18613	32
29	.25386	.17941	.25790	.18109	.26192	.18277	.26591	.18446	.26989	.18616	31
30	.25393	.17944	.25797	.18112	.26198	.18280	.26598	.18449	.26995	.18619	30
31	.25399	.17947	.25803	.18115	.26205	.18283	.26605	.18452	.27002	.18622	29
+ 8′	9.25406	.17950	9.25810	.18118	9.26212	.18286	9.26611	.18455	9.27008	.18624	28
33	.25413	.17953	.25817	.18120	.26218	.18289	.26618	.18458	.27015	.18627	27
34	.25420	.17955	.25823	.18123	.26225	.18292	.26625	.18461	.27022	.18630	26
35	.25426	.17958	.25830	.18126	.26232	.18294	.26631	.18463	.27028	.18633	25
+ 9′	9.25433	.17961	9.25837	.18129	9.26238	.18297	9.26638	.18466	9.27035	.18636	24
37	.25440	.17964	.25844	.18132	.26245	.18300	.26644	.18469	.27041	.18639	23
38	.25447	.17967	.25850	.18134	.26252	.18303	.26651	.18472	.27048	.18641	22
39	.25453	.17969	.25857	.18137	.26259	.18306	.26658	.18475	.27055	.18644	21
+ 10′	9.25460	.17972	9.25864	.18140	9.26265	.18308	9.26664	.18478	9.27061	.18647	20
41	.25467	.17975	.25870	.18143	.26272	.18311	.26671	.18480	.27068	.18650	19
42	.25474	.17978	.25877	.18146	.26279	.18314	.26678	.18483	.27074	.18653	18
43	.25480	.17981	.25884	.18148	.26285	.18317	.26684	.18486	.27081	.18656	17
+ 11′	9.25487	.17983	9.25891	.18151	9.26292	.18320	9.26691	.18489	9.27088	.18658	16
45	.25494	.17986	.25897	.18154	.26299	.18323	.26697	.18492	.27094	.18661	15
46	.25500	.17989	.25904	.18157	.26305	.18325	.26704	.18494	.27101	.18664	14
47	.25507	.17992	.25911	.18160	.26312	.18328	.26711	.18497	.27107	.18667	13
+ 12′	9.25514	.17995	9.25917	.18162	9.26319	.18331	9.26717	.18500	9.27114	.18670	12
49	.25521	.17997	.25924	.18165	.26325	.18334	.26724	.18503	.27121	.18673	11
50	.25528	.18000	.25931	.18168	.26332	.18337	.26731	.18506	.27127	.18675	10
51	.25534	.18003	.25938	.18171	.26339	.18339	.26737	.18509	.27134	.18678	9
+ 13′	9.25541	.18006	9.25944	.18174	9.26345	.18342	9.26744	.18511	9.27140	.18681	8
53	.25548	.18008	.25951	.18176	.26352	.18345	.26751	.18514	.27147	.18684	7
54	.25544	.18011	.25958	.18179	.26359	.18348	.26757	.18517	.27154	.18687	6
55	.25561	.18014	.25964	.18182	.26365	.18351	.26764	.18520	.27160	.18690	5
+ 14′	9.25568	.18017	9.25971	.18185	9.26372	.18353	9.26770	.18523	9.27167	.18692	4
57	.25575	.18020	.25978	.18188	.26378	.18356	.26777	.18526	.27173	.18695	3
58	.25581	.18022	.25984	.18190	.26385	.18359	.26784	.18528	.27180	.18698	2
59	.25588	.18025	.25991	.18193	.26392	.18362	.26790	.18531	.27186	.18701	1
+ 15′	9.22595	.18028	9.25998	.18196	9.26398	.18365	9.26979	.18534	9.27193	.18704	0
	$20^h\ 39^m$		$20^h\ 38^m$		$20^h\ 37^m$		$20^h\ 36^m$		$20^h\ 35^m$		

TABLE 45.

Haversines.

s	$3^h\,25^m$ 51° 15′		$3^h\,26^m$ 51° 30′		$3^h\,27^m$ 51° 45′		$3^h\,28^m$ 52° 0′		$3^h\,29^m$ 52° 15′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.27193	**.18704**	9.27587	**.18874**	9.27979	**.19045**	9.28368	**.19217**	9.28756	**.19389**	60
1	.27200	**.18707**	.27594	**.18877**	.27985	**.19048**	.28375	**.19220**	.28762	**.19392**	59
2	.27206	**.18710**	.27600	**.18880**	.27992	**.19051**	.28381	**.19223**	.28769	**.19395**	58
3	.27213	**.18712**	.27607	**.18883**	.27998	**.19054**	.28388	**.19226**	.28775	**.19398**	57
+ 1′	9.27219	**.18715**	9.27613	**.18886**	9.28005	**.19057**	9.28394	**.19228**	9.28782	**.19401**	56
5	.27226	**.18718**	.27620	**.18888**	.28011	**.19060**	.28401	**.19231**	.28788	**.19404**	56
6	.27233	**.18721**	.27626	**.18891**	.28018	**.19062**	.28407	**.19234**	.28794	**.19406**	54
7	.27239	**.18724**	.27633	**.18894**	.28024	**.19065**	.28414	**.19237**	.28801	**.19409**	53
+ 2′	9.27246	**.18727**	9.27639	**.18897**	9.28031	**.19068**	9.28420	**.19240**	9.28807	**.19412**	52
9	.27252	**.18729**	.27646	**.18900**	.28037	**.19071**	.28427	**.19243**	.28814	**.19415**	51
10	.27259	**.18732**	.27652	**.18903**	.28044	**.19074**	.28433	**.19246**	.28820	**.19418**	50
11	.27265	**.18735**	.27659	**.18906**	.28050	**.19077**	.28440	**.19248**	.28827	**.19421**	49
+ 3′	9.27272	**.18738**	9.27666	**.18908**	9.28057	**.19080**	9.28446	**.19251**	9.28833	**.19424**	48
13	.27279	**.18741**	.27672	**.18912**	.28063	**.19082**	.28453	**.19254**	.28840	**.19427**	47
14	.27285	**.18744**	.27679	**.18914**	.28070	**.19085**	.28459	**.19257**	.28846	**.19429**	46
15	.27292	**.18746**	.27685	**.18917**	.28076	**.19088**	.28465	**.19260**	.28852	**.19432**	45
+ 4′	9.27298	**.18749**	9.27692	**.18920**	9.28083	**.19091**	9.28472	**.19263**	9.28859	**.19435**	44
17	.27305	**.18752**	.27698	**.18923**	.28089	**.19094**	.28478	**.19266**	.28865	**.19438**	43
18	.27311	**.18755**	.27705	**.18926**	.28096	**.19097**	.28485	**.19269**	.28872	**.19441**	42
19	.27318	**.18758**	.27711	**.18928**	.28102	**.19100**	.28491	**.19271**	.28878	**.19444**	41
+ 5′	9.27325	**.18761**	9.27718	**.18931**	9.28109	**.19102**	9.28498	**.19274**	9.28885	**.19447**	40
21	.27331	**.18763**	.27724	**.18934**	.28115	**.19105**	.28504	**.19277**	.28891	**.19450**	39
22	.27338	**.18766**	.27731	**.18937**	.28122	**.19108**	.28511	**.19280**	.28897	**.19452**	38
23	.27344	**.18769**	.27737	**.18940**	.28128	**.19111**	.28517	**.19283**	.28904	**.19455**	37
+ 6′	9.27351	**.18772**	9.27744	**.18943**	9.28135	**.19114**	9.28524	**.19286**	9.28910	**.19458**	36
25	.27357	**.18775**	.27751	**.18945**	.28141	**.19117**	.28530	**.19289**	.28917	**.19461**	35
26	.27364	**.18778**	.27757	**.18948**	.28148	**.19120**	.28537	**.19291**	.28923	**.19464**	34
27	.27371	**.18780**	.27764	**.18951**	.28154	**.19122**	.28543	**.19294**	.28930	**.19467**	33
+ 7′	9.27377	**.18783**	9.27770	**.18954**	9.28161	**.19125**	9.28549	**.19297**	9.28936	**.19470**	32
29	.27384	**.18786**	.27777	**.18957**	.28167	**.19128**	.28556	**.19300**	.28942	**.19473**	31
30	.27390	**.18789**	.27783	**.18960**	.28174	**.19131**	.28562	**.19303**	.28949	**.19475**	30
31	.27397	**.18792**	.27790	**.18963**	.28180	**.19134**	.28569	**.19306**	.28955	**.19478**	29
+ 8′	9.27403	**.18795**	9.27796	**.18965**	9.28187	**.19137**	9.28575	**.19309**	9.28962	**.19481**	28
33	.27410	**.18797**	.27803	**.18968**	.28193	**.19140**	.28582	**.19311**	.28968	**.19484**	27
34	.27417	**.18800**	.27809	**.18971**	.28200	**.19142**	.28588	**.19314**	.28974	**.19487**	26
35	.27423	**.18803**	.27816	**.18974**	.28206	**.19145**	.28595	**.19317**	.28981	**.19490**	25
+ 9′	9.27430	**.18806**	9.27822	**.18977**	9.28213	**.19148**	9.28601	**.19320**	9.28987	**.19493**	24
37	.27436	**.18809**	.27829	**.18980**	.28219	**.19151**	.28608	**.19323**	.28994	**.19496**	23
38	.27443	**.18812**	.27835	**.18983**	.28226	**.19154**	.28614	**.19326**	.29000	**.19499**	22
39	.27449	**.18815**	.27842	**.18985**	.28232	**.19157**	.28620	**.19329**	.29007	**.19501**	21
+ 10′	9.27456	**.18817**	9.27848	**.18988**	9.28239	**.19160**	9.28627	**.19332**	9.29013	**.19504**	20
41	.27463	**.18820**	.27855	**.18991**	.28245	**.19163**	.28633	**.19335**	.29019	**.19507**	19
42	.27469	**.18823**	.27861	**.18994**	.28252	**.19165**	.28640	**.19337**	.29026	**.19510**	18
43	.27476	**.18826**	.27868	**.18997**	.28258	**.19168**	.28646	**.19340**	.29032	**.19513**	17
+ 11′	9.27482	**.18829**	9.27875	**.19000**	9.28265	**.19171**	9.28653	**.19343**	9.29039	**.19516**	16
45	.27489	**.18832**	.27881	**.19002**	.28271	**.19174**	.28659	**.19346**	.29045	**.19519**	15
46	.27495	**.18834**	.27888	**.19005**	.28278	**.19177**	.28666	**.19349**	.29051	**.19522**	14
47	.27502	**.18837**	.27894	**.19008**	.28284	**.19180**	.28672	**.19352**	.29058	**.19524**	13
+ 12′	9.27508	**.18840**	9.27901	**.19011**	9.28291	**.19183**	9.28679	**.19355**	9.29064	**.19527**	12
49	.27515	**.18843**	.27907	**.19014**	.28297	**.19185**	.28685	**.19358**	.29071	**.19530**	11
50	.27522	**.18846**	.27914	**.19017**	.28304	**.19188**	.28691	**.19360**	.29078	**.19533**	10
51	.27528	**.18849**	.27920	**.19020**	.28310	**.19191**	.28698	**.19363**	.29084	**.19536**	9
+ 13′	9.27535	**.18852**	9.27927	**.19022**	9.28317	**.19194**	9.28704	**.19366**	9.29090	**.19539**	8
53	.27541	**.18854**	.27933	**.19025**	.28323	**.19197**	.28711	**.19369**	.29096	**.19542**	7
54	.27548	**.18857**	.27940	**.19028**	.28330	**.19200**	.28717	**.19372**	.29103	**.19545**	6
55	.27554	**.18860**	.27946	**.19031**	.28336	**.19203**	.28724	**.19375**	.29109	**.19548**	5
+ 14′	9.27561	**.18863**	9.27953	**.19034**	9.28342	**.19205**	9.28730	**.19378**	9.29116	**.19550**	4
57	.27567	**.18866**	.27959	**.19037**	.28349	**.19208**	.28737	**.19381**	.29122	**.19553**	3
58	.27574	**.18869**	.27966	**.19040**	.28355	**.19211**	.28743	**.19383**	.29128	**.19556**	2
59	.27580	**.18871**	.27972	**.19042**	.28362	**.19214**	.28749	**.19386**	.29135	**.19559**	1
+ 15′	9.27587	**.18874**	9.27979	**.19045**	9.28368	**.19217**	9.28756	**.19389**	9.29141	**.19562**	0
	$20^h\,34^m$		$20^h\,33^m$		$20^h\,32^m$		$20^h\,31^m$		$20^h\,30^m$		

TABLE 45.

Haversines.

s	*3h 30m* 52° 30′		*3h 31m* 52° 45′		*3h 32m* 53° 0′		*3h 33m* 53° 15′		*3h 34m* 53° 30′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.29141	**.19562**	9.29524	**.19735**	9.29906	**.19909**	9.30285	**.20084**	9.30662	**.20259**	*60*
1	.29148	**.19565**	.29531	**.19738**	.29912	**.19912**	.30291	**.20087**	.30668	**.20262**	*59*
2	.29154	**.19568**	.29537	**.19741**	.29918	**.19915**	.30207	**.20090**	.30674	**.20265**	*58*
3	.29160	**.19571**	.29543	**.19744**	.29925	**.19918**	.30303	**.20093**	.30680	**.20268**	*57*
+ **1′**	9.29167	**.19573**	9.29550	**.19747**	9.29931	**.19921**	9.30310	**.20095**	9.30687	**.20271**	*56*
5	.29173	**.19576**	.29556	**.19750**	.29937	**.19924**	.30316	**.20098**	.30693	**.20273**	*55*
6	.29180	**.19579**	.29563	**.19753**	.29943	**.19927**	.30322	**.20101**	.30699	**.20276**	*54*
7	.29186	**.19582**	.29569	**.19756**	.29950	**.19930**	.30329	**.20104**	.30705	**.20279**	*53*
+ **2′**	9.29192	**.19585**	9.29575	**.19758**	9.29956	**.19932**	9.30335	**.20107**	9.30712	**.20282**	*52*
9	.29199	**.19588**	.29582	**.19761**	.29962	**.19935**	.30341	**.20110**	.30718	**.20285**	*51*
10	.29205	**.19591**	.29588	**.19764**	.29969	**.19938**	.30348	**.20113**	.30724	**.20288**	*50*
11	.29212	**.19594**	.29594	**.19767**	.29975	**.19941**	.30354	**.20116**	.30730	**.20291**	*49*
+ **3′**	9.29218	**.19597**	9.29601	**.19770**	9.29981	**.19944**	9.30360	**.20119**	9.30737	**.20294**	*48*
13	.29224	**.19599**	.29607	**.19773**	.29988	**.19947**	.30366	**.20122**	.30743	**.20297**	*47*
14	.29231	**.19602**	.29614	**.19776**	.29994	**.19950**	.30373	**.20125**	.30749	**.20300**	*46*
15	.29237	**.19605**	.29620	**.19779**	.30000	**.19953**	.30379	**.20127**	.30755	**.20303**	*45*
+ **4′**	9.29244	**.19608**	9.29626	**.19782**	9.30007	**.19956**	9.30385	**.20130**	9.30762	**.20306**	*44*
17	.29250	**.19611**	.29633	**.19785**	.30013	**.19959**	.30392	**.20133**	.30768	**.20309**	*43*
18	.29256	**.19014**	.29639	**.19787**	.30019	**.19962**	.30398	**.20136**	.30774	**.20312**	*42*
19	.29263	**.19617**	.29645	**.19790**	.30026	**.19964**	.30404	**.20139**	.30780	**.20314**	*41*
+ **5′**	9.29269	**.19620**	9.29652	**.19793**	9.30032	**.19967**	9.30410	**.20142**	9.30787	**.20317**	*40*
21	.29276	**.19623**	.29658	**.19796**	.30038	**.19970**	.30417	**.20145**	.30793	**.20320**	*39*
22	.29282	**.19625**	.29664	**.19799**	.30045	**.19973**	.30423	**.20148**	.30799	**.20323**	*38*
23	.29288	**.19628**	.29671	**.19802**	.30051	**.19976**	.30429	**.20151**	.30805	**.20326**	*37*
+ **6′**	9.29295	**.19631**	9.29677	**.19805**	9.30057	**.19979**	9.30436	**.20154**	9.30812	**.20329**	*36*
25	.29301	**.19634**	.29683	**.19808**	.30064	**.19982**	.30442	**.20157**	.30818	**.20332**	*35*
26	.29307	**.19637**	.29690	**.19811**	.30070	**.19985**	.30448	**.20160**	.30824	**.20335**	*34*
27	.29314	**.19640**	.29696	**.19814**	.30076	**.19988**	.30454	**.20162**	.30830	**.20338**	*33*
+ **7′**	9.29320	**.19643**	9.29703	**.19816**	9.30083	**.19991**	9.30461	**.20165**	9.30837	**.20341**	*32*
29	.29327	**.19646**	.29709	**.19819**	.30089	**.19994**	.30467	**.20168**	.30843	**.20344**	*31*
30	.29333	**.19649**	.29715	**.19822**	.30095	**.19996**	.30473	**.20171**	.30849	**.20347**	*30*
31	.29339	**.19651**	.29722	**.19825**	.30102	**.19999**	.30480	**.20174**	.30855	**.20350**	*29*
+ **8′**	9.29346	**.19654**	9.29728	**.19828**	9.30108	**.20002**	9.30486	**.20177**	9.30862	**.20352**	*28*
33	.29352	**.19657**	.29734	**.19831**	.30114	**.20005**	.30492	**.20180**	.30868	**.20355**	*27*
34	.29359	**.19660**	.29741	**.19834**	.30121	**.20008**	.30498	**.20183**	.30874	**.20358**	*26*
35	.29365	**.19663**	.29747	**.19837**	.30127	**.20011**	.30505	**.20186**	.30880	**.20361**	*25*
+ **9′**	9.29371	**.19666**	9.29753	**.19840**	9.30133	**.20014**	9.30511	**.20189**	9.30887	**.20364**	*24*
37	.29378	**.19669**	.29760	**.19842**	.30139	**.20017**	.30517	**.20192**	.30893	**.20367**	*23*
38	.29384	**.19672**	.29766	**.19845**	.30146	**.20020**	.30524	**.20195**	.30899	**.20370**	*22*
39	.29391	**.19675**	.29772	**.19848**	.30152	**.20023**	.30530	**.20198**	.30905	**.20373**	*21*
+ **10′**	9.29397	**.19677**	9.29779	**.19851**	9.30158	**.20026**	9.30536	**.20200**	9.30912	**.20376**	*20*
41	.29403	**.19680**	.29785	**.19854**	.30165	**.20028**	.30542	**.20203**	.30918	**.20379**	*19*
42	.29410	**.19683**	.29791	**.19857**	.30171	**.20031**	.30549	**.20206**	.30924	**.20382**	*18*
43	.29416	**.19686**	.29798	**.19860**	.30177	**.20034**	.30555	**.20209**	.30930	**.20385**	*17*
+ **11′**	9.29422	**.19689**	9.29804	**.19863**	9.30184	**.20037**	9.30561	**.20212**	9.30937	**.20388**	*16*
45	.29429	**.19692**	.29810	**.19866**	.30190	**.20040**	.30567	**.20215**	.30943	**.20391**	*15*
46	.29435	**.19695**	.29817	**.19860**	.30196	**.20043**	.30574	**.20218**	.30949	**.20393**	*14*
47	.29442	**.19698**	.29823	**.19872**	.30203	**.20046**	.30580	**.20221**	.30955	**.20396**	*13*
+ **12′**	9.29448	**.19701**	9.29829	**.19874**	9.30209	**.20049**	9.30586	**.20224**	9.30962	**.20399**	*12*
49	.29454	**.19703**	.29836	**.19877**	.30215	**.20052**	.30593	**.20227**	.30968	**.20402**	*11*
50	.29461	**.19706**	.29842	**.19880**	.30222	**.20055**	.30599	**.20230**	.30974	**.20405**	*10*
51	.29467	**.19709**	.29848	**.19883**	.30228	**.20058**	.30605	**.20233**	.30980	**.20408**	*9*
+ **13′**	9.29473	**.19712**	9.29855	**.19886**	9.30234	**.20060**	9.30611	**.20235**	9.30987	**.20411**	*8*
53	.29480	**.19715**	.29861	**.19889**	.30240	**.20063**	.30618	**.20238**	.30993	**.20414**	*7*
54	.29486	**.19718**	.29867	**.19892**	.30247	**.20066**	.30624	**.20241**	.30999	**.20417**	*6*
55	.29493	**.19721**	.29874	**.19895**	.30253	**.20069**	.30630	**.20244**	.31005	**.20420**	*5*
+ **14′**	9.29499	**.19724**	9.29880	**.19898**	9.30259	**.20072**	9.30636	**.20247**	9.31012	**.20423**	*4*
57	.29505	**.19727**	.29886	**.19901**	.30266	**.20075**	.30643	**.20250**	.31018	**.20426**	*3*
58	.29512	**.19730**	.29893	**.19903**	.30272	**.20078**	.30649	**.20253**	.31024	**.20429**	*2*
59	.29518	**.19732**	.29899	**.19906**	.30278	**.20081**	.30655	**.20256**	.31030	**.20432**	*1*
+ **15′**	9.29524	**.19735**	9.29906	**.19909**	9.30285	**.20084**	9.30662	**.20259**	9.31036	**.20435**	*0*
	20h 29m		*20h 28m*		*20h 27m*		*20h 26m*		*20h 25m*		

TABLE 45.

Haversines.

s	$3^h\ 35^m$ 53° 45′		$3^h\ 36^m$ 54° 0′		$3^h\ 37^m$ 54° 15′		$3^h\ 38^m$ 54° 30′		$3^h\ 39^m$ 54° 45′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.31036	**.20435**	9.31409	**.20611**	9.31780	**.20788**	9.32149	**.20965**	9.32516	**.21143**	60
1	.31043	**.20437**	.31416	**.20614**	.31786	**.20790**	.32155	**.20968**	.32522	**.21146**	59
2	.31049	**.20440**	.31422	**.20617**	.31793	**.20793**	.32161	**.20971**	.32528	**.21149**	58
3	.31055	**.20443**	.31428	**.20620**	.31799	**.20796**	.32168	**.20974**	.32534	**.21152**	57
+ 1′	9.31061	**.20446**	9.31434	**.20623**	9.31805	**.20799**	9.32174	**.20977**	9.32541	**.21155**	56
5	.31068	**.20449**	.31440	**.20626**	.31811	**.20802**	.32180	**.20980**	.32547	**.21158**	55
6	.31074	**.20452**	.31447	**.20629**	.31817	**.20805**	.32186	**.20983**	.32553	**.21161**	54
7	.31080	**.20455**	.31453	**.20631**	.31823	**.20808**	.32192	**.20986**	.32559	**.21164**	53
+ 2′	9.31086	**.20458**	9.31459	**.20634**	9.31830	**.20811**	9.32198	**.20989**	9.32565	**.21167**	52
9	.31093	**.20461**	.31465	**.20637**	.31836	**.20814**	.32204	**.20991**	.32571	**.21169**	51
10	.31099	**.20464**	.31471	**.20640**	.31842	**.20817**	.32210	**.20994**	.32577	**.21172**	50
11	.31105	**.20467**	.31478	**.20643**	.31848	**.20820**	.32217	**.20997**	.32583	**.21175**	49
+ 3′	9.31111	**.20470**	9.31484	**.20646**	9.31854	**.20823**	9.32223	**.21000**	9.32589	**.21178**	48
13	.31117	**.20473**	.31490	**.20649**	.31860	**.20826**	.32229	**.21003**	.32595	**.21181**	47
14	.31124	**.20476**	.31496	**.20652**	.31867	**.20829**	.32235	**.21006**	.32601	**.21184**	46
15	.31130	**.20479**	.31502	**.20655**	.31873	**.20832**	.32241	**.21009**	.32608	**.21187**	45
+ 4′	9.31136	**.20481**	9.31508	**.20658**	9.31879	**.20835**	9.32247	**.21012**	9.32614	**.21190**	44
17	.31142	**.20484**	.31515	**.20661**	.31885	**.20838**	.32253	**.21015**	.32620	**.21193**	43
18	.31149	**.20487**	.31521	**.20664**	.31891	**.20841**	.32259	**.21018**	.32626	**.21196**	42
19	.31155	**.20490**	.31527	**.20667**	.31897	**.20844**	.32266	**.21021**	.32632	**.21199**	41
+ 5′	9.31161	**.20493**	9.31533	**.20670**	9.31903	**.20847**	9.32272	**.21024**	9.32638	**.21202**	40
21	.31167	**.20496**	.31539	**.20673**	.31910	**.20850**	.32278	**.21027**	.32644	**.21205**	39
22	.31173	**.20499**	.31546	**.20675**	.31916	**.20852**	.32284	**.21030**	.32650	**.21208**	38
23	.31180	**.20502**	.31552	**.20678**	.31922	**.20855**	.32290	**.21033**	.32656	**.21211**	37
+ 6′	9.31186	**.20505**	9.31558	**.20681**	9.31928	**.20858**	9.32296	**.21036**	9.32662	**.21214**	36
25	.31192	**.20508**	.31564	**.20684**	.31934	**.20861**	.32302	**.21039**	.32668	**.21217**	35
26	.31198	**.20511**	.31570	**.20687**	.31940	**.20864**	.32308	**.21042**	.32675	**.21220**	34
27	.31205	**.20514**	.31577	**.20690**	.31947	**.20867**	.32315	**.21045**	.32681	**.21223**	33
+ 7′	9.31211	**.20517**	9.31583	**.20693**	9.31953	**.20870**	9.32321	**.21048**	9.32687	**.21226**	32
29	.31217	**.20520**	.31589	**.20696**	.31959	**.20873**	.32327	**.21051**	.32693	**.21229**	31
30	.31223	**.20523**	.31595	**.20699**	.31965	**.20876**	.32333	**.21054**	.32699	**.21232**	30
31	.31229	**.20525**	.31601	**.20702**	.31971	**.20879**	.32339	**.21057**	.32705	**.21235**	29
+ 8′	9.31236	**.20528**	9.31607	**.20705**	9.31977	**.20882**	9.32345	**.21060**	9.32711	**.21238**	28
33	.31242	**.20531**	.31614	**.20708**	.31983	**.20885**	.32351	**.21063**	.32717	**.21241**	27
34	.31248	**.20534**	.31620	**.20711**	.31990	**.20888**	.32357	**.21066**	.32723	**.21244**	26
35	.31254	**.20537**	.31626	**.20714**	.31996	**.20891**	.32363	**.21069**	.32729	**.21247**	25
+ 9′	9.31260	**.20540**	9.31632	**.20717**	9.32002	**.20894**	9.32370	**.21072**	9.32735	**.21250**	24
37	.31267	**.20543**	.31638	**.20720**	.32008	**.20897**	.32376	**.21074**	.32741	**.21253**	23
38	.31273	**.20546**	.31644	**.20723**	.32014	**.20900**	.32382	**.21077**	.32748	**.21256**	22
39	.31279	**.20549**	.31651	**.20726**	.32020	**.20903**	.32388	**.21080**	.32754	**.21259**	21
+ 10′	9.31285	**.20552**	9.31657	**.20729**	9.32026	**.20906**	9.32394	**.21083**	9.32760	**.21262**	20
41	.31291	**.20555**	.31663	**.20731**	.32033	**.20909**	.32400	**.21086**	.32766	**.21265**	19
42	.31298	**.20558**	.31669	**.20734**	.32039	**.20912**	.32406	**.21089**	.32772	**.21268**	18
43	.31304	**.20561**	.31675	**.20737**	.32045	**.20915**	.32412	**.21092**	.32778	**.21271**	17
+ 11′	9.31310	**.20564**	9.31682	**.20740**	9.32051	**.20918**	9.32418	**.21095**	9.32784	**.21274**	16
45	.31316	**.20567**	.31688	**.20743**	.32057	**.20920**	.32425	**.21098**	.32790	**.21277**	15
46	.31323	**.20570**	.31694	**.20746**	.32063	**.20923**	.32431	**.21101**	.32796	**.21280**	14
47	.31329	**.20573**	.31700	**.20749**	.32069	**.20926**	.32437	**.21104**	.32802	**.21282**	13
+ 12′	9.31335	**.20575**	9.31706	**.20752**	9.32076	**.20929**	9.32443	**.21107**	9.32808	**.21285**	12
49	.31341	**.20578**	.31712	**.20755**	.32082	**.20932**	.32449	**.21110**	.32814	**.21288**	11
50	.31347	**.20581**	.31719	**.20758**	.32088	**.20935**	.32455	**.21113**	.32820	**.21291**	10
51	.31354	**.20584**	.31725	**.20761**	.32094	**.20938**	.32461	**.21116**	.32827	**.21294**	9
+ 13′	9.31360	**.20587**	9.31731	**.20764**	9.32100	**.20941**	9.32467	**.21119**	9.32833	**.21297**	8
53	.31366	**.20590**	.31737	**.20767**	.32106	**.20944**	.32473	**.21122**	.32839	**.21300**	7
54	.31372	**.20593**	.31743	**.20770**	.32112	**.20947**	.32480	**.21125**	.32845	**.21303**	6
55	.31378	**.20596**	.31749	**.20773**	.32119	**.20950**	.32486	**.21128**	.32851	**.21306**	5
+ 14′	9.31385	**.20599**	9.31756	**.20776**	9.32125	**.20953**	9.32492	**.21131**	9.32857	**.21309**	4
57	.31391	**.20602**	.31762	**.20779**	.32131	**.20956**	.32498	**.21134**	.32863	**.21312**	3
58	.31397	**.20605**	.31768	**.20782**	.32137	**.20959**	.32504	**.21137**	.32869	**.21315**	2
59	.31403	**.20608**	.31774	**.20785**	.32143	**.20962**	.32510	**.21140**	.32875	**.21318**	1
+ 15′	9.31409	**.20611**	9.31780	**.20788**	9.32149	**.20965**	9.32516	**.21143**	9.32881	**.21321**	0
	$20^h\ 24^m$		$20^h\ 23^m$		$20^h\ 22^m$		$20^h\ 21^m$		$20^h\ 20^m$		

TABLE 45.

Haversines.

s	$3^h\ 40^m$ 55° 0′		$3^h\ 41^m$ 55° 15′		$3^h\ 42^m$ 55° 30′		$3^h\ 43^m$ 55° 45′		$3^h\ 44^m$ 56° 0′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.32881	**.21321**	9.33244	**.21500**	9.33605	**.21680**	9.33965	**.21860**	9.34322	**.22040**	60
1	.32887	**.21324**	.33250	**.21503**	.33611	**.21683**	.33971	**.21863**	.34328	**.22043**	59
2	.32893	**.21327**	.33256	**.21506**	.33617	**.21686**	.33976	**.21866**	.34334	**.22046**	58
3	.32899	**.21330**	.33262	**.21509**	.33623	**.21689**	.33982	**.21869**	.34340	**.22049**	57
+ 1′	9.32905	**.21333**	9.33268	**.21512**	9.33629	**.21692**	9.33988	**.21872**	9.34346	**.22052**	56
5	.32911	**.21336**	.33274	**.21515**	.33635	**.21695**	.33994	**.21875**	.34352	**.22055**	55
6	.32918	**.21339**	.33280	**.21518**	.33641	**.21698**	.34000	**.21878**	.34358	**.22058**	54
7	.32924	**.21342**	.33286	**.21521**	.33647	**.21701**	.34006	**.21881**	.34363	**.22061**	53
+ 2′	9.32930	**.21345**	9.33292	**.21524**	9.33653	**.21704**	9.34012	**.21884**	9.34369	**.22064**	52
9	.32936	**.21348**	.33298	**.21527**	.33659	**.21707**	.34018	**.21887**	.34375	**.22067**	51
10	.32942	**.21351**	.33305	**.21530**	.33665	**.21710**	.34024	**.21890**	.34381	**.22071**	50
11	.32948	**.21354**	.33311	**.21533**	.33671	**.21713**	.34030	**.21893**	.34387	**.22074**	49
+ 3′	9.32954	**.21357**	9.33317	**.21536**	9.33677	**.21716**	9.34036	**.21896**	9.34393	**.22077**	48
13	.32960	**.21360**	.33323	**.21539**	.33683	**.21719**	.34042	**.21899**	.34399	**.22080**	47
14	.32966	**.21363**	.33329	**.21542**	.33689	**.21722**	.34048	**.21902**	.34405	**.22083**	46
15	.32972	**.21366**	.33335	**.21545**	.33695	**.21725**	.34054	**.21905**	.34411	**.22086**	45
+ 4′	9.32978	**.21369**	9.33341	**.21548**	9.33701	**.21728**	9.34060	**.21908**	9.34417	**.22089**	44
17	.32984	**.21372**	.33347	**.21551**	.33707	**.21731**	.34066	**.21911**	.34423	**.22092**	43
18	.32990	**.21375**	.33353	**.21554**	.33713	**.21734**	.34072	**.21914**	.34429	**.22095**	42
19	.32996	**.21378**	.33359	**.21557**	.33719	**.21737**	.34078	**.21917**	.34435	**.22098**	41
+ 5′	9.33002	**.21381**	9.33365	**.21560**	9.33725	**.21740**	9.34084	**.21920**	9.34441	**.22101**	40
21	.33008	**.21384**	.33371	**.21563**	.33731	**.21743**	.34090	**.21923**	.34446	**.22104**	39
22	.33014	**.21387**	.33377	**.21566**	.33737	**.21746**	.34096	**.21926**	.34452	**.22107**	38
23	.33021	**.21390**	.33383	**.21569**	.33743	**.21749**	.34102	**.21929**	.34458	**.22110**	37
+ 6′	9.33027	**.21393**	9.33389	**.21572**	9.33749	**.21752**	9.34108	**.21932**	9.34464	**.22113**	36
25	.33033	**.21396**	.33395	**.21575**	.33755	**.21755**	.34114	**.21935**	.34470	**.22116**	35
26	.33039	**.21399**	.33401	**.21578**	.33761	**.21758**	.34120	**.21938**	.34476	**.22119**	34
27	.33045	**.21402**	.33407	**.21581**	.33767	**.21761**	.34126	**.21941**	.34482	**.22122**	33
+ 7′	9.33051	**.21405**	9.33413	**.21584**	9.33773	**.21764**	9.34132	**.21944**	9.34488	**.22125**	32
29	.33057	**.21408**	.33419	**.21587**	.33779	**.21767**	.34137	**.21947**	.34494	**.22128**	31
30	.33063	**.21411**	.33425	**.21590**	.33785	**.21770**	.34143	**.21950**	.34500	**.22131**	30
31	.33069	**.21414**	.33431	**.21593**	.33791	**.21773**	.34149	**.21953**	.34506	**.22134**	29
+ 8′	9.33075	**.21417**	9.33437	**.21596**	9.33797	**.21776**	9.34155	**.21956**	9.34512	**.22137**	28
33	.33081	**.21420**	.33443	**.21599**	.33803	**.21779**	.34161	**.21959**	.34518	**.22140**	27
34	.33087	**.21423**	.33449	**.21602**	.33809	**.21782**	.34167	**.21962**	.34524	**.22143**	26
35	.33093	**.21426**	.33455	**.21605**	.33815	**.21785**	.34173	**.21965**	.34529	**.22146**	25
+ 9′	9.33099	**.21429**	9.33461	**.21608**	9.33821	**.21788**	9.34179	**.21968**	9.34535	**.22149**	24
37	.33105	**.21431**	.33467	**.21611**	.33827	**.21791**	.34185	**.21971**	.34541	**.22152**	23
38	.33111	**.21434**	.33473	**.21614**	.33833	**.21794**	.34191	**.21974**	.34547	**.22155**	22
39	.33117	**.21437**	.33479	**.21617**	.33839	**.21797**	.34197	**.21977**	.34553	**.22158**	21
+ 10′	9.33123	**.21440**	9.33485	**.21620**	9.33845	**.21800**	9.34203	**.21980**	9.34559	**.22161**	20
41	.33129	**.21443**	.33491	**.21623**	.33851	**.21803**	.34209	**.21983**	.34565	**.22164**	19
42	.33135	**.21446**	.33497	**.21626**	.33857	**.21806**	.34215	**.21986**	.34571	**.22167**	18
43	.33142	**.21449**	.33503	**.21629**	.33863	**.21809**	.34221	**.21989**	.34577	**.22170**	17
+ 11′	9.33148	**.21452**	9.33509	**.21632**	9.33869	**.21812**	9.34227	**.21992**	9.34583	**.22173**	16
45	.33154	**.21455**	.33515	**.21635**	.33875	**.21815**	.34233	**.21995**	.34589	**.22176**	15
46	.33160	**.21458**	.33521	**.21638**	.33881	**.21818**	.34239	**.21998**	.34595	**.22179**	14
47	.33166	**.21461**	.33527	**.21641**	.33887	**.21821**	.34245	**.22001**	.34600	**.22182**	13
+ 12′	9.33172	**.21464**	9.33533	**.21644**	9.33893	**.21824**	9.34251	**.22004**	9.34606	**.22185**	12
49	.33178	**.21467**	.33539	**.21647**	.33899	**.21827**	.34256	**.22007**	.34612	**.22188**	11
50	.33184	**.21470**	.33545	**.21650**	.33905	**.21830**	.34262	**.22010**	.34618	**.22191**	10
51	.33190	**.21473**	.33551	**.21653**	.33911	**.21833**	.34268	**.22013**	.34624	**.22194**	9
+ 13′	9.33196	**.21476**	9.33557	**.21656**	9.33917	**.21836**	9.34274	**.22016**	9.34630	**.22197**	8
53	.33202	**.21479**	.33563	**.21659**	.33923	**.21839**	.34280	**.22019**	.34636	**.22200**	7
54	.33208	**.21482**	.33569	**.21662**	.33929	**.21842**	.34286	**.22022**	.34642	**.22203**	6
55	.33214	**.21485**	.33575	**.21665**	.33935	**.21845**	.34292	**.22025**	.34648	**.22206**	5
+ 14′	9.33220	**.21488**	9.33581	**.21668**	9.33941	**.21848**	9.34298	**.22028**	9.34654	**.22209**	4
57	.33226	**.21491**	.33587	**.21671**	.33947	**.21851**	.34304	**.22031**	.34660	**.22212**	3
58	.33232	**.21494**	.33593	**.21674**	.33953	**.21854**	34310	**.22034**	.34666	**.22215**	2
59	.33238	**.21497**	.33599	**.21677**	.33959	**.21857**	.34316	**.22037**	.34671	**.22218**	1
+ 15′	9.33244	**.21500**	9.33605	**.21680**	9.33965	**.21860**	9.34322	**.22040**	9.34677	**.22221**	0
	$20^h\ 19^m$		$20^h\ 18^m$		$20^h\ 17^m$		$20^h\ 16^m$		$20^h\ 15^m$		

TABLE 45.

Haversines.

s	$3^h 45^m$ 56° 15′		$3^h 46^m$ 56° 30′		$3^h 47^m$ 56° 45′		$3^h 48^m$ 57° 0′		$3^h 49^m$ 57° 15′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat .Hav.	
0	9.34677	.22221	9.35031	.22403	9.35383	.22585	9.35733	.22768	9.36081	.22951	60
1	.34683	.22225	.35037	.22406	.35389	.22588	.35738	.22771	.36086	.22954	59
2	.34689	.22228	.35043	.22409	.35394	.22591	.35744	.22774	.36092	.22957	58
3	.34695	.22231	.35049	.22412	.35400	.22594	.35750	.22777	.36098	.22960	57
+ 1′	9.34701	.22234	9.35054	.22415	9.35406	.22598	9.35756	.22780	9.36104	.22964	56
5	.34707	.22237	.35060	.22418	.35412	.22601	.35762	.22783	.36110	.22967	55
6	.34713	.22240	.35066	.22421	.35418	.22604	.35767	.22786	.36115	.22970	54
7	.34719	.22243	.35072	.22424	.35424	.22607	.35773	.22789	.36121	.22973	53
+ 2′	9.34725	.22246	9.35078	.22427	9.35429	.22610	9.35779	.22792	9.36127	.22976	52
9	.34730	.22249	.35084	.22430	.35435	.22613	.35785	.22795	.36133	.22979	51
10	.34736	.22252	.35090	.22433	.35441	.22616	.35791	.22799	.36139	.22982	50
11	.34742	.22255	.35096	.22437	.35447	.22619	.35797	.22802	.36144	.22985	49
+ 3′	9.34748	.22258	9.35101	.22440	9.35453	.22622	9.35802	.22805	9.36150	.22988	48
13	.34754	.22261	.35107	.22443	.35459	.22625	.35808	.22808	.36156	.22991	47
14	.34760	.22264	.35113	.22446	.35464	.22628	.35814	.22811	.36162	.22994	46
15	.34766	.22267	.35119	.22449	.35470	.22631	.35820	.22814	.36167	.22997	45
+ 4′	9.34772	.22270	9.35125	.22452	9.35476	.22634	9.35826	.22817	9.36173	.23000	44
17	.34778	.22273	.35131	.22455	.35482	.22637	.35831	.22820	.36179	.23003	43
18	.34784	.22276	.35137	.22458	.35488	.22640	.35837	.22823	.36185	.23006	42
19	.34789	.22279	.35143	.22461	.35494	.22643	.35843	.22826	.36191	.23009	41
+ 5′	9.34795	.22282	9.35148	.22464	9.35500	.22646	9.35849	.22829	9.36196	.23012	40
21	.34801	.22285	.35154	.22467	.35505	.22649	.35855	.22832	.36202	.23016	39
22	.34807	.22288	.35160	.22470	.35511	.22652	.35860	.22835	.36208	.23019	38
23	.34813	.22291	.35166	.22473	.35517	.22655	.35866	.22838	.36214	.23022	37
+ 6′	9.34819	.22294	9.35172	.22476	9.35523	.22658	9.35872	.22841	9.36219	.23025	36
25	.34825	.22297	.35178	.22479	.35529	.22661	.35878	.22844	.36225	.23028	35
26	.34831	.22300	.35184	.22482	.35535	.22664	.35884	.22847	.36231	.23031	34
27	.34837	.22303	.35189	.22485	.35540	.22667	.35889	.22850	.36237	.23034	33
+ 7′	9.34843	.22306	9.35195	.22488	9.35546	.22671	9.35895	.22853	9.36243	.23037	32
29	.34848	.22309	.35201	.22491	.35552	.22674	.35901	.22857	.36248	.23040	31
30	.34854	.22312	.35207	.22494	.35558	.22677	.35907	.22860	.36254	.23043	30
31	.34860	.22315	.35213	.22497	.35564	.22680	.35913	.22863	.36260	.23046	29
+ 8′	9.34866	.22318	9.35219	.22500	9.35570	.22683	9.35918	.22866	9.36266	.23049	28
33	.34872	.22321	.35225	.22503	.35575	.22686	.35924	.22869	.36271	.23052	27
34	.34878	.22324	.35230	.22506	.35581	.22689	.35930	.22872	.36277	.23055	26
35	.34884	.22327	.35236	.22509	.35587	.22692	.35936	.22875	.36283	.23058	25
+ 9′	9.34890	.22330	9.35242	.22512	9.35593	.22695	9.35942	.22878	9.36289	.23061	24
37	.34896	.22333	.35248	.22515	.35599	.22698	.35947	.22881	.36294	.23065	23
38	.34901	.22336	.35254	.22518	.35604	.22701	.35953	.22884	.36300	.23068	22
39	.34907	.22340	.35260	.22522	.35610	.22704	.35959	.22887	.36306	.23071	21
+ 10′	9.34913	.22343	9.35266	.22525	9.35616	.22707	9.35965	.22890	9.36312	.23074	20
41	.34919	.22346	.35271	.22528	.35622	.22710	.35971	.22893	.36318	.23077	19
42	.34925	.22349	.35277	.22531	.35628	.22713	.35976	.22896	.36323	.23080	18
43	.34931	.22352	.35283	.22534	.35634	.22716	.35982	.22899	.36329	.23083	17
+ 11′	9.34937	.22355	9.35289	.22537	9.35639	.22719	9.35988	.22902	9.36335	.23086	16
45	.34943	.22358	.35295	.22540	.35645	.22722	.35994	.22905	.36341	.23089	15
46	.34949	.22361	.35301	.22543	.35651	.22725	.36000	.22908	.36346	.23092	14
47	.34954	.22364	.35307	.22546	.35657	.22728	.36005	.22912	.36352	.23095	13
+ 12′	9.34960	.22367	9.35312	.22549	9.35663	.22731	9.36011	.22915	9.36358	.23098	12
49	.34966	.22370	.35318	.22552	.35669	.22735	.36017	.22918	.36364	.23101	11
50	.34972	.22373	.35324	.22555	.35674	.22738	.36023	.22921	.36369	.23104	10
51	.34978	.22376	.35330	.22558	.35680	.22741	.36029	.22924	.36375	.23107	9
+ 13′	9.34984	.22379	9.35336	.22561	9.35686	.22744	9.36034	.22927	9.36381	.23110	8
53	.34990	.22382	.35342	.22564	.35692	.22747	.36040	.22930	.36387	.23114	7
54	.34996	.22385	.35348	.22567	.35698	.22750	.36046	.22933	.36392	.23117	6
55	.35002	.22388	.35353	.22570	.35703	.22753	.36052	.22936	.36398	.23120	5
+ 14′	9.35007	.22391	9.35359	.22573	9.35709	.22756	9.36058	.22939	9.36404	.23123	4
57	.35013	.22394	.35365	.22576	.35715	.22759	.36063	.22942	.36410	.23126	3
58	.35019	.22397	.35371	.22579	.35721	.22762	.36069	.22945	.36415	.23129	2
59	.35025	.22400	.35377	.22582	.35727	.22765	.36075	.22948	.36421	.23132	1
+ 15′	9.35031	.22403	9.35383	.22585	9.35733	.22768	9.36081	.22951	9.36427	.23135	0
	$20^h 14^m$		$20^h 13^m$		$20^h 12^m$		$20^h 11^m$		$20^h 10^m$		

TABLE 45.

Haversines.

	$3^h\,50^m$ 57° 30′		$3^h\,51^m$ 57° 45′		$3^h\,52^m$ 58° 0′		$3^h\,53^m$ 58° 15′		$3^h\,54^m$ 58° 30′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat Hav.	s
0	9.36427	.23135	9.36772	.23319	9.37114	.23504	9.37455	.23689	9.37794	.23875	60
1	.36433	.23138	.36777	.23322	.37120	.23507	.37461	.23692	.37800	.23878	59
2	.36439	.23141	.36783	.23325	.37126	.23510	.37467	.23695	.37806	.23881	58
3	.36444	.23144	.36789	.23329	.37131	.23513	.37472	.23699	.37811	.23884	57
+ 1′	9.36450	.23147	9.36794	.23332	9.37137	.23516	9.37478	.23702	9.37817	.23887	56
5	.36456	.23150	.36800	.23335	.37143	.23519	.37484	.23705	.37823	.23891	55
6	.36462	.23153	.36806	.23338	.37148	.23523	.37489	.23708	.37828	.23894	54
7	.36467	.23156	.36812	.23341	.37154	.23526	.37495	.23711	.37834	.23897	53
+ 2′	9.36473	.23160	9.36817	.23344	9.37160	.23529	9.37501	.23714	9.37840	.23900	52
9	.36479	.23163	.36823	.23347	.37166	.23532	.37506	.23717	.37845	.23903	51
10	.36485	.23166	.36829	.23350	.37171	.23535	.37512	.23720	.37851	.23906	50
11	.36490	.23169	.36834	.23353	.37177	.23538	.37518	.23723	.37856	.23909	49
+ 3′	9.36496	.23172	9.36840	.23356	9.37183	.23541	9.37523	.23726	9.37862	.23912	48
13	.36502	.23175	.36846	.23359	.37188	.23544	.37529	.23729	.37868	.23915	47
14	.36508	.23178	.36852	.23362	.37194	.23547	.37535	.23733	.37873	.23918	46
15	.36513	.23181	.36857	.23365	.37200	.23550	.37540	.23736	.37879	.23922	45
+ 4′	9.36519	.23184	9.36863	.23368	9.37205	.23553	9.37546	.23739	9.37885	.23925	44
17	.36525	.23187	.36869	.23372	.37211	.23556	.37552	.23742	.37890	.23928	43
18	.36531	.23190	.36875	.23375	.37217	.23560	.37557	.23745	.37896	.23931	42
19	.36536	.23193	.36880	.23378	.37222	.23563	.37563	.23748	.37902	.23934	41
+ 5′	9.36542	.23196	9.36886	.23381	9.37228	.23566	9.37569	.23751	9.37907	.23937	40
21	.36548	.23199	.36892	.23384	.37234	.23569	.37574	.23754	.37913	.23940	39
22	.36554	.23203	.36897	.23387	.37239	.23572	.37580	.23757	.37918	.23943	38
23	.36559	.23206	.36903	.23390	.37245	.23575	.37585	.23760	.37924	.23946	37
+ 6′	9.36565	.23209	9.36909	.23393	9.37251	.23578	9.37591	.23764	9.37930	.23950	36
25	.36571	.23212	.36915	.23396	.37257	.23581	.37597	.23767	.37935	.23953	35
26	.36577	.23215	.36920	.23399	.37262	.23584	.37602	.23770	.37941	.23956	34
27	.36582	.23218	.36926	.23402	.37268	.23587	.37608	.23773	.37947	.23959	33
+ 7′	9.36588	.23221	9.36932	.23405	9.37274	.23590	9.37614	.23776	9.37952	.23962	32
29	.36594	.23224	.36937	.23409	.37279	.23594	.37619	.23779	.37958	.23965	31
30	.36599	.23227	.36943	.23412	.37285	.23597	.37625	.23782	.37963	.23968	30
31	.36605	.23230	.36949	.23415	.37291	.23600	.37631	.23785	.37969	.23971	29
+ 8′	9.36611	.23233	9.36955	.23418	9.37296	.23603	9.37636	.23788	9.37975	.23974	28
33	.36617	.23236	.36960	.23421	.37302	.23606	.37642	.23791	.37980	.23977	27
34	.36622	.23239	.36966	.23424	.37308	.23609	.37648	.23795	.37986	.23981	26
35	.36628	.23242	.36972	.23427	.37313	.23612	.37653	.23798	.37992	.23984	25
+ 9′	9.36634	.23246	9.36977	.23430	9.37319	.23615	9.37659	.23801	9.37997	.23987	24
37	.36640	.23249	.36983	.23433	.37325	.23618	.37665	.23804	.38003	.23990	23
38	.36645	.23252	.36989	.23436	.37330	.23621	.37670	.23807	.38008	.23993	22
39	.36651	.23255	.36995	.23439	.37336	.23624	.37676	.23810	.38014	.23996	21
+ 10′	9.36657	.23258	9.37000	.23442	9.37342	.23627	9.37682	.23813	9.38020	.23999	20
41	.36663	.23261	.37006	.23445	.37347	.23631	.37687	.23816	.38025	.24002	19
42	.36668	.23264	.37012	.23449	.37353	.23634	.37693	.23819	.38031	.24005	18
43	.36674	.23267	.37017	.23452	.37359	.23637	.37699	.23822	.38037	.24009	17
+ 11′	9.36680	.23270	9.37023	.23455	9.37364	.23640	9.37704	.23825	9.38042	.24012	16
45	.36686	.23273	.37029	.23458	.37370	.23643	.37710	.23829	.38048	.24015	15
46	.36691	.23276	.37034	.23461	.37376	.23646	.37715	.23832	.38053	.24018	14
47	.36697	.23279	.37040	.23464	.37382	.23649	.37721	.23835	.38059	.24021	13
+ 12′	9.36703	.23282	9.37046	.23467	9.37387	.23652	9.37727	.23838	9.38065	.24024	12
49	.36708	.23285	.37052	.23470	.37393	.23655	.37732	.23841	.38070	.24027	11
50	.36714	.23289	.37057	.23473	.37399	.23658	.37738	.23844	.38076	.24030	10
51	.36720	.23292	.37063	.23476	.37404	.23661	.37744	.23847	.38081	.24033	9
+ 13′	9.36726	.23295	9.37069	.23479	9.37410	.23665	9.37749	.23850	9.38087	.24036	8
53	.36731	.23298	.37074	.23482	.37416	.23668	.37755	.23853	.38093	.24040	7
54	.36737	.23301	.37080	.23486	.37421	.23671	.37761	.23856	.38098	.24043	6
55	.36743	.23304	.37086	.23489	.37427	.23674	.37766	.23860	.38104	.24046	5
+ 14′	9.36749	.23307	9.37091	.23492	9.37433	.23677	9.37772	.23863	9.38110	.24049	4
57	.36754	.23310	.37097	.23495	.37438	.23680	.37778	.23866	.38115	.24052	3
58	.36760	.23313	.37103	.23498	.37444	.23683	.37783	.23869	.38121	.24055	2
59	.36766	.23316	.37109	.23501	.37450	.23680	.37789	.23872	.38126	.24058	1
+ 15′	9.36772	.23319	9.37114	.23504	9.37455	.23689	9.37794	.23875	9.38132	.24061	0
	$20^h\,9^m$		$20^h\,8^m$		$20^h\,7^m$		$20^h\,6^m$		$20^h\,5^m$		

TABLE 45.

Haversines.

	$3^h\,55^m$ 58° 45′		$3^h\,56^m$ 59° 0′		$3^h\,57^m$ 59° 15′		$3^h\,58^m$ 59° 30′		$3^h\,59^m$ 59° 45′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.38132	**.24061**	9.38468	**.24248**	9.38802	**.24435**	9.39134	**.24623**	9.39465	**.24811**	60
1	.38138	**.24064**	.38473	**.24251**	.38807	**.24438**	.39140	**.24626**	.39470	**.24814**	59
2	.38143	**.24068**	.38479	**.24254**	.38813	**.24442**	.39145	**.24629**	.39476	**.24818**	58
3	.38149	**.24071**	.38485	**.24257**	.38819	**.24445**	.39151	**.24632**	.39481	**.24821**	57
+ 1′	9.38154	**.24074**	9.38490	**.24261**	9.38824	**.24448**	9.39156	**.24636**	9.39487	**.24824**	56
5	.38160	**.24077**	.38496	**.24264**	.38830	**.24451**	.39162	**.24639**	.39492	**.24827**	55
6	.38166	**.24080**	.38501	**.24267**	.38835	**.24454**	.39167	**.24642**	.39498	**.24830**	54
7	.38171	**.24083**	.38507	**.24270**	.38841	**.24457**	.39173	**.24645**	.39503	**.24833**	53
+ 2′	9.38177	**.24086**	9.38512	**.24273**	9.38846	**.24460**	9.39178	**.24648**	9.39509	**.24836**	52
9	.38182	**.24089**	.38518	**.24276**	.38852	**.24463**	.39184	**.24651**	.39514	**.24840**	51
10	.38188	**.24092**	.38524	**.24279**	.38857	**.24467**	.39189	**.24654**	.39520	**.24843**	50
11	.38194	**.24096**	.38529	**.24282**	.38863	**.24470**	.39195	**.24658**	.39525	**.24846**	49
+ 3′	9.38199	**.24099**	9.38535	**.24286**	9.38868	**.24473**	9.39201	**.24661**	9.39531	**.24849**	48
13	.38205	**.24102**	.38540	**.24289**	.38874	**.24476**	.39206	**.24664**	.39536	**.24852**	47
14	.38210	**.24105**	.38546	**.24292**	.38880	**.24479**	.39212	**.24667**	.39542	**.24855**	46
15	.38216	**.24108**	.38551	**.24295**	.38885	**.24482**	.39217	**.24670**	.39547	**.24858**	45
+ 4′	9.38222	**.24111**	9.38557	**.24298**	9.38891	**.24485**	9.39223	**.24673**	9.39553	**.24862**	44
17	.38227	**.24114**	.38563	**.24301**	.38896	**.24488**	.39228	**.24676**	.39558	**.24865**	43
18	.38233	**.24117**	.38568	**.24304**	.38902	**.24492**	.39234	**.24680**	.39564	**.24868**	42
19	.38239	**.24120**	.38574	**.24307**	.38907	**.24495**	.39239	**.24683**	.39569	**.24871**	41
+ 5′	9.38244	**.24124**	9.38579	**.24310**	9.38913	**.24498**	9.39245	**.24686**	9.39575	**.24874**	40
21	.38250	**.24127**	.38585	**.24314**	.38918	**.24501**	.39250	**.24689**	.39580	**.24877**	39
22	.38255	**.24130**	.38590	**.24317**	.38924	**.24504**	.39256	**.24692**	.39586	**.24880**	38
23	.38261	**.24133**	.38596	**.24320**	.38929	**.24507**	.39261	**.24695**	.39591	**.24884**	37
+ 6′	9.38267	**.24136**	9.38602	**.24323**	9.38935	**.24510**	9.39267	**.24698**	9.39597	**.24887**	36
25	.38272	**.24139**	.38607	**.24326**	.38941	**.24514**	.39272	**.24701**	.39602	**.24890**	35
26	.38278	**.24142**	.38613	**.24329**	.38946	**.24517**	.39278	**.24705**	.39608	**.24893**	34
27	.38283	**.24145**	.38618	**.24332**	.38952	**.24520**	.39283	**.24708**	.39613	**.24896**	33
+ 7′	9.38289	**.24148**	9.38624	**.24335**	9.38957	**.24523**	9.39289	**.24711**	9.39619	**.24899**	32
29	.38295	**.24152**	.38629	**.24339**	.38963	**.24526**	.39294	**.24714**	.39624	**.24902**	31
30	.38300	**.24155**	.38635	**.24342**	.38968	**.24529**	.39300	**.24717**	.39630	**.24906**	30
31	.38306	**.24158**	.38641	**.24345**	.38974	**.24532**	.39305	**.24720**	.39635	**.24909**	29
+ 8′	9.38311	**.24161**	9.38646	**.24348**	9.38979	**.24535**	9.39311	**.24723**	9.39641	**.24912**	28
33	.38317	**.24164**	.38652	**.24351**	.38985	**.24539**	.39316	**.24727**	.39646	**.24915**	27
34	.38322	**.24167**	.38657	**.24354**	.38990	**.24542**	.39322	**.24730**	.39652	**.24918**	26
35	.38328	**.24170**	.38663	**.24357**	.38996	**.24545**	.39327	**.24733**	.39657	**.24921**	25
+ 9′	9.38334	**.24173**	9.38668	**.24360**	9.39002	**.24548**	9.39333	**.24736**	9.39663	**.24924**	24
37	.38339	**.24176**	.38674	**.24364**	.39007	**.24551**	.39338	**.24739**	.39668	**.24928**	23
38	.38345	**.24180**	.38680	**.24367**	.39013	**.24554**	.39344	**.24742**	.39674	**.24931**	22
39	.38350	**.24183**	.38685	**.24370**	.39018	**.24557**	.39349	**.24745**	.39679	**.24934**	21
+ 10′	9.38356	**.24186**	9.38691	**.24373**	9.39024	**.24560**	9.39355	**.24749**	9.39685	**.24937**	20
41	.38362	**.24189**	.38696	**.24376**	.39029	**.24564**	.39360	**.24752**	.39690	**.24940**	19
42	.38367	**.24192**	.38702	**.24379**	.39035	**.24567**	.39366	**.24755**	.39695	**.24943**	18
43	.38373	**.24195**	.38707	**.24382**	.39040	**.24570**	.39371	**.24758**	.39701	**.24946**	17
+ 11′	9.38378	**.24198**	9.38713	**.24385**	9.39046	**.24573**	9.39377	**.24761**	9.39706	**.24950**	16
45	.38384	**.24201**	.38719	**.24388**	.39051	**.24576**	.39382	**.24764**	.39712	**.24953**	15
46	.38390	**.24204**	.38724	**.24392**	.39057	**.24579**	.39388	**.24767**	.39717	**.24956**	14
47	.38395	**.24208**	.38730	**.24395**	.39062	**.24582**	.39393	**.24770**	.39723	**.24959**	13
+ 12′	9.38401	**.24211**	9.38735	**.24398**	9.39068	**.24586**	9.39399	**.24774**	9.39728	**.24962**	12
49	.38406	**.24214**	.38741	**.24401**	.39073	**.24589**	.39404	**.24777**	.39734	**.24965**	11
50	.38412	**.24217**	.38746	**.24404**	.39079	**.24592**	.39410	**.24780**	.39739	**.24969**	10
51	.38418	**.24220**	.38752	**.24407**	.39085	**.24595**	.39415	**.24783**	.39745	**.24972**	9
+ 13′	9.38423	**.24223**	9.38757	**.24410**	9.39090	**.24598**	9.39421	**.24786**	9.39750	**.24975**	8
53	.38429	**.24226**	.38763	**.24413**	.39096	**.24601**	.39426	**.24789**	.39756	**.24978**	7
54	.38434	**.24229**	.38769	**.24417**	.39101	**.24604**	.39432	**.24792**	.39761	**.24981**	6
55	.38440	**.24233**	.38774	**.24420**	.39107	**.24607**	.39437	**.24796**	.39767	**.24984**	5
+ 14′	9.38445	**.24236**	9.38780	**.24423**	9.39112	**.24611**	9.39443	**.24799**	9.39772	**.24987**	4
57	.38451	**.24239**	.38785	**.24426**	.39118	**.24614**	.39448	**.24802**	.39778	**.24991**	3
58	.38457	**.24242**	.38791	**.24429**	.39123	**.24617**	.39454	**.24805**	.39783	**.24994**	2
59	.38462	**.24245**	.38796	**.24432**	.39129	**.24620**	.39459	**.24808**	.39789	**.24997**	1
+ 15′	9.38468	**.24248**	9.38802	**.24435**	9.39134	**.24623**	9.39465	**.24811**	9.39794	**.25000**	0
	$20^h\,4^m$		$20^h\,3^m$		$20^h\,2^m$		$20^h\,1^m$		$20^h\,0^m$		

TABLE 45.

Haversines.

	$4^{h}\ 0^{m}$ 60° 0′		$4^{h}\ 1^{m}$ 60° 15′		$4^{h}\ 2^{m}$ 60° 30′		$4^{h}\ 3^{m}$ 60° 45′		$4^{h}\ 4^{m}$ 61° 0′		
s –	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log.Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.39794	.25000	9.40121	.25189	9.40447	.25379	9.40771	.25569	9.41094	.25760	60
1	.39799	.25003	.40127	.25192	.40453	.25382	.40777	.25572	.41099	.25763	59
2	.39805	.25006	.40132	.25195	.40458	.25385	.40782	.25575	.41105	.25766	58
3	.39810	.25009	.40138	.25199	.40463	.25388	.40787	.25578	.41110	.25769	57
+ 1′	9.39816	.25013	9.40143	.25202	9.40469	.25391	9.40793	.25582	9.41115	.25772	56
5	.39821	.25016	.40149	.25205	.40474	.25395	.40798	.25585	.41121	.25775	55
6	.39827	.25019	.40154	.25208	.40480	.25398	.40804	.25588	.41126	.25779	54
7	.39832	.25022	.40159	.25211	.40485	.25401	.40809	.25591	.41131	.25782	53
+ 2′	9.39838	.25025	9.40165	.25214	9.40490	.25404	9.40814	.25594	9.41137	.25785	52
9	.39843	.25028	.40170	.25218	.40496	.25407	.40820	.25597	.41142	.25788	51
10	.39849	.25032	.40176	.25221	.40501	.25410	.40825	.25601	.41147	.25791	50
11	.39854	.25035	.40181	.25224	.40507	.25414	.40831	.25604	.41153	.25795	49
+ 3′	9.39860	.25038	9.40187	.25227	9.40512	.25417	9.40836	.25607	9.41158	.25798	48
13	.39865	.25041	.40192	.25230	.40518	.25420	.40841	.25610	.41163	.25801	47
14	.39871	.25044	.40198	.25233	.40523	.25423	.40847	.25613	.41169	.25804	46
15	.39876	.25047	.40203	.25237	.40528	.25426	.40852	.25617	.41174	.25807	45
+ 4′	9.39881	.25050	9.40208	.25240	9.40534	.25429	9.40858	.25620	9.41180	.25810	44
17	.39887	.25054	.40214	.25243	.40539	.25433	.40863	.25623	.41185	.25814	43
18	.39892	.25057	.40219	.25246	.40545	.25436	.40868	.25626	.41190	.25817	42
19	.39898	.25060	.40225	.25249	.40550	.25439	.40874	.25629	.41196	.25820	41
+ 5′	9.39903	.25063	9.40230	.25252	9.40555	.25442	9.40879	.25632	9.41201	.25823	40
21	.39909	.25066	.40236	.25255	.40561	.25445	.40884	.25636	.41206	.25826	39
22	.39914	.25069	.40241	.25259	.40566	.25448	.40890	.25639	.41212	.25830	38
23	.39920	.25072	.40246	.25262	.40572	.25452	.40895	.25642	.41217	.25833	37
+ 6′	9.39925	.25076	9.40252	.25265	9.40577	.25455	9.40900	.25645	9.41222	.25836	36
25	.39931	.25079	.40257	.25268	.40582	.25458	.40906	.25648	.41228	.25839	35
26	.39936	.25082	.40263	.25271	.40588	.25461	.40911	.25651	.41233	.25842	34
27	.39942	.25085	.40268	.25274	.40593	.25464	40917	.25655	.41238	.25845	33
+ 7′	9.39947	.25088	9.40274	.25278	9.40599	.25467	9.40922	.25658	9.41244	.25849	32
29	.39952	.25091	.40279	.25281	.40604	.25471	.40927	.25661	.41249	.25852	31
30	.39958	.25095	.40284	.25284	.40609	.25474	.40933	.25664	.41254	.25855	30
31	.39963	.25098	.40290	.25287	.40615	.25477	.40938	.25667	.41260	.25858	29
+ 8′	9.39969	.25101	9.40295	.25290	9.40620	.25480	9.40943	.25671	9.41265	.25861	28
33	.39974	.25104	.40301	.25293	.40626	.25483	.40949	.25674	.41270	.25865	27
34	.39980	.25107	.40306	.25297	.40631	.25487	.40954	.25677	.41276	.25868	26
35	.39985	.25110	.40312	.25300	.40636	.25490	.40960	.25680	.41281	.25871	25
+ 9′	9.39991	.25113	9.40317	.25303	9.40642	.25493	9.40965	.25683	9.41287	.25874	24
37	.39996	.25117	.40322	.25306	.40647	.25496	.40970	.25686	.41292	.25877	23
38	.40002	.25120	.40328	.25309	.40653	.25499	.40976	.25690	.41297	.25880	22
39	.40007	.25123	.40333	.25312	.40658	.25502	.40981	.25693	.41303	.25884	21
+ 10′	9.40012	.25126	9.40339	.25316	9.40663	.25506	9.40986	.25696	9.41308	.25887	20
41	.40018	.25129	.40344	.25319	.40669	.25509	.40992	.25699	.41313	.25890	19
42	.40023	.25132	.40350	.25322	.40674	.25512	.40997	.25702	.41319	.25893	18
43	.40029	.25136	.40355	.25325	.40680	.25515	.41003	.25705	.41324	.25896	17
+ 11′	9.40034	.25139	9.40360	.25328	9.40685	.25518	9.41008	.25709	9.41329	.25900	16
45	.40040	.25142	.40366	.25331	.40690	.25521	.41013	.25712	.41335	.25903	15
46	.40045	.25145	.40371	.25335	.40696	.25525	.41019	.25715	.41340	.25906	14
47	.40051	.25148	.40377	.25338	.40701	.25528	.41024	.25718	.41345	.25909	13
+ 12′	9.40056	.25151	9.40382	.25341	9.40707	.25531	9.41029	.25721	9.41351	.25912	12
49	.40062	.25154	.40388	.25344	.40712	.25534	.41035	.25724	.41356	.25915	11
50	.40067	.25158	.40393	.25347	.40717	.25537	.41040	.25728	.41361	.25919	10
51	.40072	.25161	.40398	.25350	.40723	.25540	.41046	.25731	.41367	.25922	9
+ 13′	9.40078	.25164	9.40404	.25354	9.40728	.25544	9.41051	.25734	9.41372	.25925	8
53	.40083	.25167	.40409	.25357	.40734	.25547	.41056	.25737	.41377	.25928	7
54	.40089	.25170	.40415	.25360	.40739	.25550	.41062	.25740	.41383	.25931	6
55	.40094	.25173	.40420	.25363	.40744	.25553	.41067	.25744	.41388	.25935	5
+ 14′	9.40100	.25177	9.40425	.25366	9.40750	.25556	9.41072	.25747	9.41393	.25938	4
57	.40105	.25180	.40431	.25369	.40755	.25559	.41078	.25750	.41399	.25941	3
58	.40111	.25183	.40436	.25372	.40761	.25563	.41083	.25753	.41404	.25944	2
59	.40116	.25186	.40442	.25376	.40766	.25566	.41088	.25756	.41409	.25947	1
+ 15′	9.40121	.25189	9.40447	.25379	9.40771	.25569	9.41094	.25760	9.41415	.25951	0
	$19^{h}\ 59^{m}$		$19^{h}\ 58^{m}$		$19^{h}\ 57^{m}$		$19^{h}\ 56^{m}$		$19^{h}\ 55^{m}$		

TABLE 45.

Haversines.

	$4^h\ 5^m$ 61° 15′		$4^h\ 6^m$ 61° 30′		$4^h\ 7^m$ 61° 45′		$4^h\ 8^m$ 62° 0′		$4^h\ 9^m$ 62° 15′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.41415	**.25951**	9.41734	**.26142**	9.42052	**.26334**	9.42368	**.26526**	9.42682	**.26719**	60
1	.41420	**.25954**	.41739	**.26145**	.42057	**.26337**	.42373	**.26530**	.42688	**.26722**	59
2	.41425	**.25957**	.41745	**.26148**	.42062	**.26340**	.42378	**.26533**	.42693	**.26726**	58
3	.41431	**.25960**	.41750	**.26152**	.42068	**.26344**	.42384	**.26536**	.42698	**.26729**	57
+ 1′	9.41436	**.25963**	9.41755	**.26155**	9.42073	**.26347**	9.42389	**.26539**	9.42703	**.26732**	56
5	.41441	**.25966**	.41761	**.26158**	.42078	**.26350**	.42394	**.26543**	.42709	**.26735**	55
6	.41447	**.25970**	.41766	**.26161**	.42083	**.26353**	.42399	**.26546**	.42714	**.26739**	54
7	.41452	**.25973**	.41771	**.26164**	.42089	**.26356**	.42405	**.26549**	.42719	**.26742**	53
+ 2′	9.41457	**.25976**	9.41776	**.26168**	9.42094	**.26360**	9.42410	**.26552**	9.42724	**.26745**	52
9	.41463	**.25979**	.41782	**.26171**	.42099	**.26363**	.42415	**.26555**	.42730	**.26748**	51
10	.41468	**.25982**	.41787	**.26174**	.42105	**.26366**	.42420	**.26559**	.42735	**.26751**	50
11	.41473	**.25986**	.41792	**.26177**	.42110	**.26369**	.42426	**.26562**	.42740	**.26755**	49
+ 3′	9.41479	**.25989**	9.41798	**.26180**	9.42115	**.26372**	9.42431	**.26565**	9.42745	**.26758**	48
13	.41484	**.25992**	.41803	**.26184**	.42120	**.26376**	.42436	**.26568**	.42750	**.26761**	47
14	.41489	**.25995**	.41808	**.26187**	.42126	**.26379**	.42441	**.26571**	.42756	**.26764**	46
15	.41495	**.25998**	.41814	**.26190**	.42131	**.26382**	.42447	**.26575**	.42761	**.26768**	45
+ 4′	9.41500	**.26002**	9.41819	**.26193**	9.42136	**.26385**	9.42452	**.26578**	9.42766	**.26771**	44
17	.41505	**.26005**	.41824	**.26196**	.42141	**.26389**	.42457	**.26581**	.42771	**.26774**	43
18	.41511	**.26008**	.41829	**.26200**	.42147	**.26392**	.42462	**.26584**	.42777	**.26777**	42
19	.41516	**.26011**	.41835	**.26203**	.42152	**.26395**	.42468	**.26587**	.42782	**.26780**	41
+ 5′	9.41521	**.26014**	9.41840	**.26206**	9.42157	**.26398**	9.42473	**.26591**	9.42787	**.26784**	40
21	.41527	**.26017**	.41845	**.26209**	.42163	**.26402**	.42478	**.26594**	.42792	**.26787**	39
22	.41532	**.26021**	.41851	**.26212**	.42168	**.26405**	.42483	**.26597**	.42797	**.26790**	38
23	.41537	**.26024**	.41856	**.26216**	.42173	**.26408**	.42489	**.26600**	.42803	**.26793**	37
+ 6′	9.41543	**.26027**	9.41861	**.26219**	9.42178	**.26411**	9.42494	**.26604**	9.42808	**.26797**	36
25	.41548	**.26030**	.41867	**.26222**	.42184	**.26414**	.42499	**.26607**	.42813	**.26800**	35
26	.41553	**.26033**	.41872	**.26225**	.42189	**.26417**	.42504	**.26610**	.42818	**.26803**	34
27	.41559	**.26037**	.41877	**.26228**	.42194	**.26421**	.42510	**.26613**	.42824	**.26806**	33
+ 7′	9.41564	**.26040**	9.41882	**.26232**	9.42199	**.26424**	9.42515	**.26616**	9.42829	**.26809**	32
29	.41569	**.26043**	.41888	**.26235**	.42205	**.26427**	.42520	**.26620**	.42834	**.26813**	31
30	.41575	**.26046**	.41893	**.26238**	.42210	**.26430**	.42525	**.26623**	.42839	**.26816**	30
31	.41580	**.26049**	.41898	**.26241**	.42215	**.26433**	.42531	**.26626**	.42844	**.26819**	29
+ 8′	9.41585	**.26053**	9.41904	**.26244**	9.42221	**.26437**	9.42536	**.26629**	9.42850	**.26822**	28
33	.41590	**.26056**	.41909	**.26248**	.42226	**.26440**	.42541	**.26632**	.42855	**.26826**	27
34	.41596	**.26059**	.41914	**.26251**	.42231	**.26443**	.42546	**.26636**	.42860	**.26829**	26
35	.41601	**.26062**	.41920	**.26254**	.42236	**.26446**	.42552	**.26639**	.42865	**.26832**	25
+ 9′	9.41606	**.26065**	9.41925	**.26257**	9.42242	**.26449**	9.42557	**.26642**	9.42870	**.26835**	24
37	.41612	**.26069**	.41930	**.26260**	.42247	**26453**	.42562	**.26645**	.42876	**.26838**	23
38	.41617	**.26072**	.41935	**.26264**	.42252	**.26456**	.42567	**.26649**	.42881	**.26842**	22
39	.41622	**.26075**	.41941	**.26267**	.42257	**.26459**	.42573	**.26652**	.42886	**.26845**	21
+ 10′	9.41628	**.26078**	9.41946	**.26270**	9.42263	**.26462**	9.42578	**.26655**	9.42891	**.26848**	20
41	.41633	**.26081**	.41951	**.26273**	.42268	**.26465**	.42583	**.26658**	.42897	**.26851**	19
42	41638	**.26085**	.41957	**.26276**	.42273	**.26469**	.42588	**.26661**	.42902	**.26855**	18
43	.41644	**.26088**	.41962	**.26280**	.42278	**.26472**	.42593	**.26665**	.42907	**.26858**	17
+ 11′	9.41649	**.26091**	9.41967	**.26283**	9.42284	**.26475**	9.42599	**.26668**	9.42912	**.26861**	16
45	.41654	**.26094**	.41972	**.26286**	.42289	**.26478**	.42604	**.26671**	.42917	**.26864**	15
46	.41660	**.26097**	.41978	**.26289**	.42294	**.26481**	.42609	**.26674**	.42923	**.26867**	14
47	.41665	**.26101**	.41983	**.26292**	.42300	**.26485**	.42614	**.26677**	.42928	**.26871**	13
+ 12′	9.41670	**.26104**	9.41988	**.26296**	9.42305	**.26488**	9.42620	**.26681**	9.42933	**.26874**	12
49	.41676	**.26107**	.41994	**.26299**	.42310	**.26491**	.42625	**.26684**	.42938	**.26877**	11
50	.41681	**.26110**	.41999	**.26302**	.42315	**.26494**	.42630	**.26687**	.42943	**.26880**	10
51	.41686	**.26113**	.42004	**.26305**	.42321	**.26498**	.42635	**.26690**	.42949	**.26883**	9
+ 13′	9.41692	**.26117**	9.42009	**.26308**	9.42326	**.26501**	9.42641	**.26694**	9.42954	**.26887**	8
53	.41697	**.26120**	.42015	**.26312**	.42331	**.26504**	.42646	**.26697**	.42959	**.26890**	7
54	.41702	**.26123**	.42020	**.26315**	.42336	**.26507**	.42651	**.26700**	.42964	**.26893**	6
55	.41707	**.26126**	.42025	**.26318**	.42342	**.26510**	.42656	**.26703**	.42969	**.26896**	5
+ 14′	9.41713	**.26129**	9.42031	**.26321**	9.42347	**.26514**	9.42662	**.26706**	9.42975	**.26900**	4
57	.41718	**.26132**	.42036	**.26324**	.42352	**.26517**	.42667	**.26710**	.42980	**.26903**	3
58	.41723	**.26136**	.42041	**.26328**	.42357	**.26520**	.42672	**.26713**	.42985	**.26906**	2
59	.41729	**.26139**	.42046	**.26331**	.42363	**.26523**	.42677	**.26716**	.42990	**.26909**	1
+ 15′	9.41734	**.26142**	9.42052	**.26334**	9.42368	**.26526**	9.42682	**.26719**	9.42996	**.26912**	0
	$19^h\ 54^m$		$19^h\ 53^m$		$19^h\ 52^m$		$19^h\ 51^m$		$19^h\ 50^m$		

TABLE 45.

Haversines.

s	$4^h\ 10^m$ 62° 30′		$4^h\ 11^m$ 62° 45′		$4^h\ 12^m$ 63° 0′		$4^h\ 13^m$ 63° 15′		$4^h\ 14^m$ 63° 30′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.42996	.26913	9.43307	.27106	9.43617	.27300	9.43926	.27495	9.44232	.27690	60
1	.43001	.26916	.43312	.27110	.43622	.27304	.43931	.27498	.44238	.27693	59
2	.43006	.26919	.43317	.27113	.43627	.27307	.43936	.27502	.44243	.27697	58
3	.43011	.26922	.43323	.27116	.43632	.27310	.43941	.27505	.44248	.27700	57
+ 1′	9.43016	.26925	9.43328	.27119	9.43638	.27313	9.43946	.27508	9.44253	.27703	56
5	.43022	.26929	.43333	.27122	.43643	.27317	.43951	.27511	.44258	.27706	55
6	.43027	.26932	.43338	.27126	.43648	.27320	.43956	.27515	.44263	.27710	54
7	.43032	.26935	.43343	.27129	.43653	.27323	.43961	.27518	.44268	.27713	53
+ 2′	9.43037	.26938	9.43348	.27132	9.43658	.27326	9.43967	.27521	9.44273	.27716	52
9	.43042	.26942	.43354	.27135	.43663	.27330	.43972	.27524	.44278	.27719	51
10	.43048	.26945	.43359	.27139	.43669	.27333	.43977	.27528	.44283	.27723	50
11	.43053	.26948	.43364	.27142	.43674	.27336	.43982	.27531	.44289	.27726	49
+ 3′	9.43058	.26951	9.43369	.27145	9.43679	.27339	9.43987	.27534	9.44294	.27729	48
13	.43063	.26955	.43374	.27148	.43684	.27343	.43992	.27537	.44299	.27732	47
14	.43068	.26958	.43380	.27152	.43689	.27346	.43997	.27541	.44304	.27736	46
15	.43074	.26961	.43385	.27155	.43694	.27349	.44002	.27544	.44309	.27739	45
+ 4′	9.43079	.26964	9.43390	.27158	9.43699	.27352	9.44008	.27547	9.44314	.27742	44
17	.43084	.26967	.43395	.27161	.43705	.27356	.44013	.27550	.44319	.27745	43
18	.43089	.26971	.43400	.27165	.43710	.27359	.44018	.27554	.44324	.27749	42
19	.43094	.26974	.43405	.27168	.43715	.27362	.44023	.27557	.44329	.27752	41
+ 5′	9.43100	.26977	9.43411	.27171	9.43720	.27365	9.44028	.27560	9.44334	.27755	40
21	.43105	.26980	.43416	.27174	.43725	.27369	.44033	.27563	.44340	.27758	39
22	.43110	.26984	.43421	.27177	.43730	.27372	.44038	.27567	.44345	.27762	38
23	.43115	.26987	.43426	.27181	.43735	.27375	.44043	.27570	.44350	.27765	37
+ 6′	9.43120	.26990	9.43431	.27184	9.43741	.27378	9.44048	.27573	9.44355	.27768	36
25	.43126	.26993	.43436	.27187	.43746	.27382	.44054	.27576	.44360	.27772	35
26	.43131	.26996	.43442	.27190	.43751	.27385	.44059	.27580	.44365	.27775	34
27	.43136	.27000	.43447	.27194	.43756	.27388	.44064	.27583	.44370	.27778	33
+ 7′	9.43141	.27003	9.43452	.27197	9.43761	.27391	9.44069	.27586	9.44375	.27781	32
29	.43146	.27006	.43457	.27200	.43766	.27394	.44074	.27589	.44380	.27785	31
30	.43151	.27009	.43462	.27203	.43771	.27398	.44079	.27593	.44385	.27788	30
31	43157	.27013	.43467	.27207	.43777	.27401	.44084	.27596	.44390	.27791	29
+ 8′	9.43162	.27016	9.43473	.27210	9.43782	.27404	9.44089	.27599	9.44396	.27794	28
33	.43167	.27019	.43478	.27213	.43787	.27407	.44095	.27602	.44401	.27798	27
34	.43172	.27022	.43483	.27216	.43792	.27411	.44100	.27606	.44406	.27801	26
35	.43177	.27025	.43488	.27220	.43797	.27414	.44105	.27609	.44411	.27804	25
+ 9′	9.43183	.27029	9.43493	.27223	9.43802	.27417	9.44110	.27612	9.44416	.27807	24
37	.43188	.27032	.43498	.27226	.43807	.27420	.44115	.27615	.44421	.27811	23
38	.43193	.27035	.43504	.27229	.43813	.27424	.44120	.27619	.44426	.27814	22
39	.43198	.27038	.43509	.27232	.43818	.27427	.44125	.27622	.44431	.27817	21
+ 10′	9.43203	.27042	9.43514	.27236	9.43823	.27430	9.44130	.27625	9.44436	.27820	20
41	.43209	.27045	.43519	.27239	.43828	.27433	.44135	.27628	.44441	.27824	19
42	.43214	.27048	.43524	.27242	.43833	.27437	.44141	.27632	.44446	.27827	18
43	.43219	.27051	.43529	.27245	.43838	.27440	.44146	.27635	.44452	.27830	17
+ 11′	9.43224	.27055	9.43535	.27249	9.43843	.27443	9.44151	.27638	9.44457	.27833	16
45	.43229	.27058	.43540	.27252	.43849	.27446	.44156	.27641	.44462	.27837	15
46	.43234	.27061	.43545	.27255	.43854	.27450	.44161	.27645	.44467	.27840	14
47	.43240	.27064	.43550	.27258	.43859	.27453	.44166	.27648	.44472	.27843	13
+ 12′	9.43245	.27068	9.43555	.27262	9.43864	.27456	9.44171	.27651	9.44477	.27846	12
49	.43250	.27071	.43560	.27265	.43869	.27459	44176	.27654	.44482	.27850	11
50	.43255	.27074	.43565	.27268	.43874	.27463	.44181	.27658	.44487	.27853	10
51	.43260	.27077	.43571	.27271	.43879	.27466	.44187	.27661	.44492	.27856	9
+ 13′	9.43266	.27080	9.43576	.27275	9.43884	.27469	9.44192	.27664	9.44497	.27859	8
53	.43271	.27084	.43581	.27278	.43890	.27472	.44197	.27667	.44502	.27863	7
54	.43276	.27087	.43586	.27281	.43895	.27476	.44202	.27671	.44507	.27866	6
55	.43281	.27090	.43591	.27284	.43900	.27479	.44207	.27674	.44513	.27869	5
+ 14′	9.43286	.27093	9.43596	.27288	9.43905	.27482	9.44212	.27677	9.44518	.27873	4
57	.43291	.27997	.43602	.27291	.43910	.27485	.44217	.27680	.44523	.27876	3
58	.43297	.27100	.43607	.27294	.43915	.27489	.44222	.27684	.44528	.27879	2
59	.43302	.27103	.43612	.27297	.43920	.27492	.44227	.27687	.44533	.27882	1
+ 15′	9.43307	.27106	9.43617	.27300	9.43926	.27495	9.44232	.27690	9.44538	.27886	0
	$19^h\ 49^m$		$19^h\ 48^m$		$19^h\ 47^m$		$19^h\ 46^m$		$19^h\ 45^m$		

TABLE 45.

Haversines.

s	$4^h 15^m$ 63° 45′		$4^h 16^m$ 64° 0′		$4^h 17^m$ 64° 15′		$4^h 18^m$ 64° 30′		$4^h 19^m$ 64° 45′		
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.44538	**.27886**	9.44842	**.28081**	9.45144	**.28278**	9.45446	**.28474**	9.45745	**.28672**	60
1	.44543	**.27889**	.44847	**.28085**	.45149	**.28281**	.45451	**.28478**	.45750	**.28675**	59
2	.44548	**.27892**	.44852	**.28088**	.45155	**.28284**	.45456	**.28481**	.45755	**.28678**	58
3	.44553	**.27895**	.44857	**.28091**	.45160	**.28288**	.45461	**.28484**	.45760	**.28681**	57
+ 1′	9.44558	**.27899**	9.44862	**.28095**	9.45165	**.28291**	9.45466	**.28488**	9.45765	**.28685**	56
5	.44563	**.27902**	.44867	**.28098**	.45170	**.28294**	.45471	**.28491**	.45770	**.28688**	55
6	.44568	**.27905**	.44872	**.28101**	.45175	**.28297**	.45476	**.28494**	.45775	**.28691**	54
7	.44573	**.27908**	.44877	**.28104**	.45180	**.28301**	.45481	**.28497**	.45780	**.28695**	53
+ 2′	9.44579	**.27912**	9.44882	**.28108**	9.45185	**.28304**	9.45486	**.28501**	9.45785	**.28698**	52
9	.44584	**.27915**	.44887	**.28111**	.45190	**.28307**	.45491	**.28504**	.45790	**.28701**	51
10	.44589	**.27918**	.44892	**.28114**	.45195	**.28310**	.45496	**.28507**	.45795	**.28704**	50
11	.44594	**.27921**	.44898	**.28117**	.45200	**.28314**	.45501	**.28511**	.45800	**.28708**	49
+ 3′	9.44599	**.27925**	9.44903	**.28121**	9.45205	**.28317**	9.45506	**.28514**	9.45805	**.28711**	48
13	.44604	**.27928**	.44908	**.28124**	.45210	**.28320**	.45511	**.28517**	.45810	**.28714**	47
14	.44609	**.27931**	.44913	**.28127**	.45215	**.28324**	.45516	**.28520**	.45815	**.28718**	46
15	.44614	**.27935**	.44918	**.28130**	.45220	**.28327**	.45521	**.28524**	.45820	**.28721**	45
+ 4′	9.44619	**.27938**	9.44923	**.28134**	9.45225	**.28330**	9.45526	**.28527**	9.45825	**.28724**	44
17	.44624	**.27941**	.44928	**.28137**	.45230	**.28333**	.45531	**.28530**	.45830	**.28727**	43
18	.44629	**.27944**	.44933	**.28140**	.45235	**.28337**	.45536	**.28534**	.45835	**.28731**	42
19	.44634	**.27948**	.44938	**.28144**	.45240	**.28340**	.45541	**.28537**	.45840	**.28734**	41
+ 5′	9.44639	**.27951**	9.44943	**.28147**	9.45245	**.28343**	9.45546	**.28540**	9.45845	**.28737**	40
21	.44645	**.27954**	.44948	**.28150**	.45250	**.28347**	.45551	**.28543**	.45850	**.28741**	39
22	.44650	**.27957**	.44953	**.28153**	.45255	**.28350**	.45556	**.28547**	.45855	**.28744**	38
23	.44655	**.27961**	.44958	**.28157**	.45260	**.28353**	.45561	**.28550**	.45860	**.28747**	37
+ 6′	9.44660	**.27964**	9.44963	**.28160**	9.45265	**.28356**	9.45566	**.28553**	9.45865	**.28751**	36
25	.44665	**.27967**	.44968	**.28163**	.45270	**.28360**	.45571	**.28557**	.45870	**.28754**	35
26	.44670	**.27970**	.44973	**.28166**	.45275	**.28363**	.45576	**.28560**	.45875	**.28757**	34
27	.44675	**.27974**	.44978	**.28170**	.45280	**.28366**	.45581	**.28563**	.45879	**.28760**	33
+ 7′	9.44680	**.27977**	9.44983	**.28173**	9.45285	**.28369**	9.45586	**.28566**	9.45884	**.28764**	32
29	.44685	**.27980**	.44988	**.28176**	.45290	**.28373**	.45591	**.28570**	.45889	**.28767**	31
30	.44690	**.27983**	.44993	**.28180**	.45295	**.28376**	.45596	**.28573**	.45894	**.28770**	30
31	.44695	**.27987**	.44998	**.28183**	.45300	**.28379**	.45601	**.28576**	.45899	**.28774**	29
+ 8′	9.44700	**.27990**	9.45003	**.28186**	9.45305	**.28383**	9.45606	**.28580**	9.45904	**.28777**	28
33	.44705	**.27993**	.45009	**.28189**	.45310	**.28386**	.45610	**.28583**	.45909	**.28780**	27
34	.44710	**.27997**	.45014	**.28193**	.45315	**.28389**	.45615	**.28586**	.45914	**.28783**	26
35	.44715	**.28000**	.45019	**.28196**	.45320	**.28392**	.45620	**.28589**	.45919	**.28787**	25
+ 9′	9.44721	**.28003**	9.45024	**.28199**	9.45325	**.28396**	9.45625	**.28593**	9.45924	**.28790**	24
37	.44726	**.28006**	.45029	**.28202**	.45330	**.28399**	.45630	**.28596**	.45929	**.28793**	23
38	.44731	**.28010**	.45034	**.28206**	.45335	**.28402**	.45635	**.28599**	.45934	**.28797**	22
39	.44736	**.28013**	.45039	**.28209**	.45340	**.28406**	.45640	**.28603**	.45939	**.28800**	21
+ 10′	9.44741	**.28016**	9.45044	**.28212**	9.45345	**.28409**	9.45645	**.28606**	9.45944	**.28803**	20
41	.44746	**.28019**	.45049	**.28216**	.45350	**.28412**	.45650	**.28609**	.45949	**.28807**	19
42	.44751	**.28023**	.45054	**.28219**	.45355	**.28415**	.45655	**.28612**	.45954	**.28810**	18
43	.44756	**.28026**	.45059	**.28222**	.45360	**.28419**	.45660	**.28616**	.45959	**.28813**	17
+ 11′	9.44761	**.28029**	9.45064	**.28225**	9.45365	**.28422**	9.45665	**.28619**	9.45964	**.28816**	16
45	.44766	**.28032**	.45069	**.28229**	.45370	**.28425**	.45670	**.28622**	.45969	**.28820**	15
46	.44771	**.28036**	.45074	**.28232**	.45375	**.28429**	.45675	**.28626**	.45974	**.28823**	14
47	.44776	**.28039**	.45079	**.28235**	.45380	**.28432**	.45680	**.28629**	.45979	**.28826**	13
+ 12′	9.44781	**.28042**	9.45084	**.28238**	9.45385	**.28435**	9.45685	**.28632**	9.45984	**.28830**	12
49	.44786	**.28046**	.45089	**.28242**	.45390	**.28438**	.45690	**.28635**	.45989	**.28833**	11
50	.44791	**.28049**	.45094	**.28245**	.45395	**.28442**	.45695	**.28639**	.45994	**.28836**	10
51	.44796	**.28052**	.45099	**.28248**	.45400	**.28445**	.45700	**.28642**	.45999	**.28839**	9
+ 13′	9.44801	**.28055**	9.45104	**.28252**	9.45405	**.28448**	9.45705	**.28645**	9.46004	**.28843**	8
53	.44807	**.28059**	.45109	**.28255**	.45410	**.28451**	.45710	**.28649**	.46009	**.28846**	7
54	.44812	**.28062**	.45114	**.28258**	.45415	**.28455**	.45715	**.28652**	.46014	**.28849**	6
55	.44817	**.28065**	.45119	**.28261**	.45420	**.28458**	.45720	**.28655**	.46019	**.28853**	5
+ 14′	9.44822	**.28068**	9.45124	**.28265**	9.45426	**.28461**	9.45725	**.28658**	9.46023	**.28856**	4
57	.44827	**.28072**	.45129	**.28268**	.45431	**.28465**	.45730	**.28662**	.46028	**.28859**	3
58	.44832	**.28075**	.45134	**.28271**	.45436	**.28468**	.45735	**.28665**	.46033	**.28863**	2
59	.44837	**.28078**	.45139	**.28274**	.45441	**.28471**	.45740	**.28668**	.46038	**.28866**	1
+ 15′	9.44842	**.28081**	9.45144	**.28278**	9.45446	**.28474**	9.45745	**.28672**	9.46043	**.28869**	0
	$19^h 44^m$		$19^h 43^m$		$19^h 42^m$		$19^h 41^m$		$19^h 40^m$		

TABLE 45.

Haversines.

	$4^h\ 20^m$ 65° 0′		$4^h\ 21^m$ 65° 15′		$4^h\ 22^m$ 65° 30′		$4^h\ 23^m$ 65° 45′		$4^h\ 24^m$ 66° 0′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.46043	.28869	9.46340	.29067	9.46635	.29265	9.46929	.29464	9.47222	.29663	60
1	.46048	.28872	.46345	.29070	.46640	.29269	.46934	.29467	.47227	.29666	59
2	.46053	.28876	.46350	.29074	.46645	.29272	.46939	.29471	.47231	.29670	58
3	.46058	.28879	.46355	.29077	.46650	.29275	.46944	.29474	.47236	.29673	57
+ 1′	9.46063	.28882	9.46360	.29080	9.46655	.29279	9.46949	.29477	9.47241	.29676	56
5	.46068	.28886	.46365	.29084	.46660	.29282	.46954	.29481	.47246	.29680	55
6	.46073	.28889	.46370	.29087	.46665	.29285	.46959	.29484	.47251	.29683	54
7	.46078	.28892	.46375	.29090	.46670	.29289	.46963	.29487	.47256	.29686	53
+ 2′	9.46083	.28895	9.46380	.29093	9.46675	.29292	9.46968	.29491	9.47261	.29690	52
9	.46088	.28899	.46384	.29097	.46680	.29295	.46973	.29494	.47266	.29693	51
10	.46093	.28902	.46389	.29100	.46684	.29298	.46978	.29497	.47270	.29696	50
11	.46098	.28905	.46394	.29103	.46689	.29302	.46983	.29501	.47275	.29700	49
+ 3′	9.46103	.28909	9.46399	.29107	9.46694	.29305	9.46988	.29504	9.47280	.29703	48
13	.46108	.28912	.46404	.29110	.46699	.29308	.46993	.29507	.47285	.29706	47
14	.46113	.28915	.46409	.29113	.46704	.29312	.46998	.29510	.47290	.29710	46
15	.46118	.28918	.46414	.29117	.46709	.29315	.47003	.29514	.47295	.29713	45
+ 4′	9.46123	.28922	9.46419	.29120	9.46714	.29318	9.47007	.29517	9.47300	.29716	44
17	.46128	.28925	.46424	.29123	.46719	.29322	.47012	.29520	.47304	.29720	43
18	.46132	.28928	.46429	.29126	.46724	.29325	.47017	.29524	.47309	.29723	42
19	.46137	.28932	.46434	.29130	.46729	.29328	.47022	.29527	.47314	.29726	41
+ 5′	9.46142	.28935	9.46439	.29133	9.46733	.29332	9.47027	.29530	9.47319	.29730	40
21	.46147	.28938	.46444	.29136	.46738	.29335	.47032	.29534	.47324	.29733	39
22	.46152	.28942	.46448	.29140	.46743	.29338	.47037	.29537	.47329	.29736	38
23	.46157	.28945	.46453	.29143	.46748	.29341	.47042	.29540	.47334	.29740	37
+ 6′	9.46162	.28948	9.46458	.29146	9.46753	.29345	9.47046	.29544	9.47338	.29743	36
25	.46167	.28952	.46463	.29150	.46758	.29348	.47051	.29547	.47343	.29746	35
26	.46172	.28955	.46468	.29153	.46763	.29351	.47056	.29550	.47348	.29750	34
27	.46177	.28958	.46473	.29156	.46768	.29355	.47061	.29554	.47353	.29753	33
+ 7′	9.46182	.28961	9.46478	.29160	9.46773	.29358	9.47066	.29557	9.47358	.29756	32
29	.46187	.28965	.46483	.29163	.46778	.29361	.47071	.29560	.47363	.29760	31
30	.46192	.28968	.46488	.29166	.46782	.29365	.47076	.29564	.47367	.29763	30
31	.46197	.28971	.46493	.29169	.46787	.29368	.47081	.29567	.47372	.29766	29
+ 8′	9.46202	.28975	9.46498	.29173	9.46792	.29371	9.47085	.29570	9.47377	.29770	28
33	.46207	.28978	.46503	.29176	.46797	.29375	.47090	.29573	.47382	.29773	27
34	.46212	.28981	.46508	.29179	.46802	.29378	.47095	.29577	.47387	.29776	26
35	.46217	.28985	.46512	.29183	.46807	.29381	.47100	.29580	.47392	.29779	25
+ 9′	9.46222	.28988	9.46517	.29186	9.46812	.29385	9.47105	.29583	9.47397	.29783	24
37	.46226	.28991	.46522	.29189	.46817	.29388	.47110	.29587	.47401	.29786	23
38	.46231	.28994	.46527	.29193	.46822	.29391	.47115	.29590	.47406	.29789	22
39	.46236	.28998	.46532	.29196	.46827	.29394	.47120	.29593	.47411	.29793	21
+ 10′	9.46241	.29001	9.46537	.29199	9.46831	.29398	9.47124	.29597	9.47416	.29790	20
41	.46246	.29004	.46542	.29202	.46836	.29401	.47129	.29600	.47421	.29799	19
42	.46251	.29008	.46547	.29206	.46841	.29404	.47134	.29603	.47426	.29803	18
43	.46256	.29011	.46552	.29209	.46846	.29408	.47139	.29607	.47431	.29806	17
+ 11′	9.46261	.29014	9.46557	.29212	9.46851	.29411	9.47144	.29610	9.47435	.29809	16
45	.46266	.29017	.46562	.29216	.46856	.29414	.47149	.29613	.47440	.29813	15
46	.46271	.29021	.46567	.29219	.46861	.29418	.47154	.29617	.47445	.29816	14
47	.46276	.29024	.46571	.29222	.46866	.29421	.47159	.29620	.47450	.29819	13
+ 12′	9.46281	.29027	9.46576	.29226	9.46871	.29424	9.47163	.29623	9.47455	.29823	12
49	.46286	.29031	.46581	.29229	.46875	.29428	.47168	.29627	.47460	.29826	11
50	.46291	.29034	.46586	.29232	.46880	.29431	.47173	.29630	.47464	.29829	10
51	.46296	.29037	.46591	.29236	.46885	.29434	.47178	.29633	.47469	.29833	9
+ 13′	9.46301	.29041	9.46596	.29239	9.46890	.29438	9.47183	.29637	9.47474	.29836	8
53	.46305	.29044	.46601	.29242	.46895	.29441	.47188	.29640	.47479	.29839	7
54	.46310	.29047	.46606	.29245	.46900	.29444	.47193	.29643	.47484	.29843	6
55	.46315	.29051	.46611	.29249	.46905	.29447	.47197	.29647	.47489	.29846	5
+ 14′	9.46320	.29054	9.46616	.29252	9.46910	.29451	9.47202	.29650	9.47493	.29849	4
57	.46325	.29057	.46621	.29255	.46915	.29454	.47207	.29653	.47498	.29853	3
58	.46330	.29060	.46626	.29259	.46919	.29457	.47212	.29657	.47503	.29856	2
59	.46335	.29004	.46630	.29202	.46924	.29461	.47217	.29666	.47508	.29859	1
+ 15′	9.46340	.29067	9.46635	.29265	9.46929	.29464	9.47222	.29663	9.47513	.29863	0
	$19^h\ 39^m$		$19^h\ 38^m$		$19^h\ 37^m$		$19^h\ 36^m$		$19^h\ 35^m$		

TABLE 45.

Haversines.

	$4^h\ 25^m$ **66° 15′**		$4^h\ 26^m$ **66° 30′**		$4^h\ 27^m$ **66° 45′**		$4^h\ 28^m$ **67° 0′**		$4^h\ 29^m$ **67° 15′**		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.47513	**.29863**	9.47803	**.30063**	9.48091	**.30263**	9.48378	**.30463**	9.48664	**.30664**	*60*
1	.47518	**.29866**	.47807	**.30066**	.48096	**.30266**	.48383	**.30467**	.48668	**.30668**	*59*
2	.47523	**.29869**	.47812	**.30069**	.48101	**.30269**	.48387	**.30470**	.48673	**.30671**	*58*
3	.47527	**.29873**	.47817	**.30073**	.48105	**.30273**	.48392	**.30473**	.48678	**.30675**	*57*
+ **1′**	9.47532	**.29876**	9.47822	**.30076**	9.48110	**.30276**	9.48397	**.30477**	9.48683	**.30678**	*56*
5	.47537	**.29879**	.47827	**.30079**	.48115	**.30280**	.48402	**.30480**	.48687	**.30681**	*55*
6	.47542	**.29883**	.47831	**.30083**	.48120	**.30283**	.48407	**.30484**	.48692	**.30685**	*54*
7	.47547	**.29886**	.47836	**.30086**	.48124	**.30286**	.48411	**.30487**	.48697	**.30688**	*53*
+ **2′**	9.47552	**.29889**	9.47841	**.30089**	9.48129	**.30290**	9.48416	**.30490**	9.48702	**.30691**	*52*
9	.47556	**.29893**	.47846	**.30093**	.48134	**.30293**	.48421	**.30494**	.48706	**.30695**	*51*
10	.47561	**.29896**	.47851	**.30096**	.48139	**.30296**	.48426	**.30497**	.48711	**.30698**	*50*
11	.47566	**.29899**	.47856	**.30099**	.48144	**.30300**	.48430	**.30500**	.48716	**.30701**	*49*
+ **3′**	9.47571	**.29903**	9.47860	**.30103**	9.48148	**.30303**	9.48435	**.30504**	9.48720	**.30705**	*48*
13	.47576	**.29906**	.47865	**.30106**	.48153	**.30300**	.48440	**.30507**	.48725	**.30708**	*47*
14	.47581	**.29909**	.47870	**.30109**	.48158	**.30310**	.48445	**.30510**	.48730	**.30711**	*46*
15	.47585	**.29913**	.47875	**.30113**	.48163	**.30313**	.48449	**.30514**	.48735	**.30715**	*45*
+ **4′**	9.47590	**.29916**	9.47880	**.30116**	9.48168	**.30316**	9.48454	**.30517**	9.48739	**.30718**	*44*
17	.47595	**.29919**	.47884	**.30119**	.48172	**.30320**	.48459	**.30520**	.48744	**.30721**	*43*
18	.47600	**.29923**	.47889	**.30123**	.48177	**.30323**	.48464	**.30524**	.48749	**.30725**	*42*
19	.47605	**.29926**	.47894	**.30126**	.48182	**.30326**	.48468	**.30527**	.48754	**.30728**	*41*
+ **5′**	9.47610	**.29929**	9.47899	**.30129**	9.48187	**.30330**	9.48473	**.30530**	9.48758	**.30732**	*40*
21	.47614	**.29933**	.47904	**.30133**	.48192	**.30333**	.48478	**.30534**	.48763	**.30735**	*39*
22	.47619	**.29936**	.47908	**.30136**	.48196	**.30336**	.48483	**.30537**	.48768	**.30738**	*38*
23	.47624	**.29939**	.47913	**.30139**	.48201	**.30340**	.48488	**.30540**	.48773	**.30742**	*37*
+ **6′**	9.47629	**.29943**	9.47918	**.30143**	9.48206	**.30343**	9.48492	**.30544**	9.48777	**.30745**	*36*
25	.47634	**.29946**	.47923	**.30146**	.48211	**.30346**	.48497	**.30547**	.48782	**.30748**	*35*
26	.47639	**.29949**	.47928	**.30149**	.48215	**.30350**	.48502	**.30551**	.48787	**.30752**	*34*
27	.47643	**.29953**	.47933	**.30153**	.48220	**.30353**	.48507	**.30554**	.48792	**.30755**	*33*
+ **7′**	9.47648	**.29956**	9.47937	**.30156**	9.48225	**.30356**	9.48511	**.30557**	9.48796	**.30758**	*32*
29	.47653	**.29959**	.47942	**.30159**	.48230	**.30360**	.48516	**.30561**	.48801	**.30762**	*31*
30	.47658	**.29963**	.47947	**.36163**	.48235	**.30363**	.48521	**.30564**	.48806	**.30765**	*30*
31	.47663	**.29906**	.47952	**.30166**	.48239	**.30366**	.48526	**.30567**	.48811	**.30768**	*29*
+ **8′**	9.47668	**.29969**	9.47957	**.30169**	9.48244	**.30370**	9.48530	**.30571**	9.48815	**.30772**	*28*
33	.47672	**.29973**	.47961	**.30173**	.48249	**.30373**	.48535	**.30574**	.48820	**.30775**	*27*
34	.47677	**.29976**	.47966	**.30176**	.48254	**.30376**	.48540	**.30577**	.48825	**.30779**	*26*
35	.47682	**.29079**	.47971	**.30179**	.48258	**.30380**	.48545	**.30581**	.48830	**.30782**	*25*
+ **9′**	9.47687	**.29983**	9.47976	**.30183**	9.48263	**.30383**	9.48549	**.30584**	9.48834	**.30785**	*24*
37	.47692	**.29986**	.47981	**.30186**	.48268	**.30386**	.48554	**.30587**	.48839	**.30789**	*23*
38	.47697	**.29989**	.47985	**.30189**	.48273	**.30390**	.48559	**.30591**	.48844	**.30792**	*22*
39	.47701	**.29993**	.47990	**.30193**	.48278	**.30393**	.48564	**.30594**	.48848	**.30795**	*21*
+ **10′**	9.47706	**.29996**	9.47995	**.30196**	9.48282	**.30397**	9.48568	**.30597**	9.48853	**.30799**	*20*
41	.47711	**.29999**	.48000	**.30199**	.48287	**.30400**	.48573	**.30601**	.48858	**.30802**	*19*
42	.47716	**.30003**	.48005	**.30203**	.48292	**.30403**	.48578	**.30604**	.48863	**.30805**	*18*
43	.47721	**.30006**	.48009	**.30206**	.48297	**.30407**	.48583	**.30607**	.48867	**.30809**	*17*
+ **11′**	9.47725	**.30009**	9.48014	**.30209**	9.48302	**.30410**	9.48587	**.30611**	9.48872	**.30812**	*16*
45	.47730	**.30013**	.48019	**.30213**	.48306	**.30413**	.48592	**.30614**	.48877	**.30815**	*15*
46	.47735	**.30016**	.48024	**.30216**	.48311	**.30417**	.48597	**.30618**	.48882	**.30819**	*14*
47	.47740	**.30019**	.48029	**.30219**	.48316	**.30420**	.48602	**.30621**	.48886	**.30822**	*13*
+ **12′**	9.47745	**.30023**	9.48033	**.30223**	9.48321	**.30423**	9.48607	**.30624**	9.48891	**.30826**	*12*
49	.47750	**.30026**	.48038	**.30226**	.48325	**.30427**	.48611	**.30628**	.48896	**.30829**	*11*
50	.47754	**.30029**	.48043	**.30229**	.48330	**.30430**	.48616	**.30631**	.48901	**.30832**	*10*
51	.47759	**.30033**	.48048	**.30233**	.48335	**.30433**	.48621	**.30634**	.48905	**.30836**	*9*
+ **13′**	9.47764	**.30036**	9.48053	**.30236**	9.48340	**.30437**	9.48626	**.30638**	9.48910	**.30839**	*8*
53	.47769	**.30039**	.48057	**.30239**	.48344	**.30440**	.48630	**.30641**	.48915	**.30842**	*7*
54	.47774	**.30043**	.48062	**.30243**	.48349	**.30443**	.48635	**.30644**	.48919	**.30846**	*6*
55	.47778	**.30046**	.48067	**.30246**	.48354	**.30447**	.48640	**.30648**	.48924	**.30849**	*5*
+ **14′**	9.47783	**.30049**	9.48072	**.30249**	9.48359	**.30450**	9.48645	**.30651**	9.48929	**.30852**	*4*
57	.47788	**.30053**	.48077	**.30253**	.48364	**.30453**	.48649	**.30655**	.48934	**.30856**	*3*
58	.47793	**.30056**	.48081	**.30256**	.48368	**.30457**	.48654	**.30658**	.48938	**.30859**	*2*
59	.47798	**.30059**	.48086	**.30259**	.48373	**.30460**	.48659	**.30601**	.48943	**.30862**	*1*
+ **15′**	9.47803	**.30063**	9.48091	**.30263**	9.48378	**.30463**	9.48664	**.30664**	9.48948	**.30866**	*0*
	$19^h\ 34^m$		$19^h\ 33^m$		$19^h\ 32^m$		$19^h\ 31^m$		$19^h\ 30^m$		

TABLE 45.

Haversines.

	$4^{h}\,30^{m}$ 67° 30′		$4^{h}\,31^{m}$ 67° 45′		$4^{h}\,32^{m}$ 68° 0′		$4^{h}\,33^{m}$ 68° 15′		$4^{h}\,34^{m}$ 68° 30′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.48948	.30866	9.49231	.31068	9.49512	.31270	9.49793	.31472	9.50072	.31675	60
1	.48953	.30869	.49235	.31071	.49517	.31273	.49797	.31475	.50076	.31678	59
2	.48957	.30873	.49240	.31074	.49522	.31276	.49802	.31479	.50081	.31682	58
3	.48962	.30876	.49245	.31078	.49226	.31280	.49807	.31482	.50085	.31685	57
+ 1′	9.48967	.30879	9.49250	.31081	9.49531	.31283	9.49811	.31486	9.50090	.31688	56
5	.48971	.30883	.49254	.31084	.49536	.31287	.49816	.31489	.50095	.31692	55
6	.48976	.30886	.49259	.31088	.49540	.31290	.49821	.31492	.50099	.31695	54
7	.48981	.30889	.49264	.31091	.49545	.31293	.49825	.31496	.50104	.31699	53
+ 2′	9.48986	.30893	9.49268	.31095	9.49550	.31297	9.49830	.31499	9.50109	.31702	52
9	.48990	.30896	.49273	.31098	.49554	.31300	.49835	.31503	.50113	.31705	51
10	.48995	.30899	.49278	.31101	.49559	.31303	.49839	.31506	.50118	.31709	50
11	.49000	.30903	.49282	.31105	.49564	.31307	.49844	.31509	.50123	.31712	49
+ 3′	9.49004	.30906	9.49287	.31108	9.49568	.31310	9.49849	.31513	9.50127	.31716	48
13	.49009	.30910	.49292	.31111	.49573	.31314	.49853	.31516	.50132	.31719	47
14	.49014	.30913	.49297	.31115	.49578	.31317	.49858	.31519	.50136	.31722	46
15	.49019	.30916	.49301	.31118	.49583	.31320	.49862	.31523	.50141	.31726	45
+ 4′	9.49023	.30920	9.49306	.31121	9.49587	.31324	9.49867	.31526	9.50146	.31729	44
17	.49028	.30923	.49311	.31125	.49592	.31327	.49872	.31530	.50150	.31732	43
18	.49033	.30926	.49315	.31128	.49597	.31330	.49876	.31533	.50155	.31736	42
19	.49038	.30930	.49320	.31132	.49601	.31334	.49881	.31536	.50160	.31739	41
+ 5′	9.49042	.30933	9.49325	.31135	9.49606	.31337	9.49886	.31540	9.50164	.31742	40
21	.49047	.30936	.49329	.31138	.49611	.31341	.49890	.31543	.50169	.31746	39
22	.49052	.30940	.49334	.31142	.49615	.31344	.49895	.31546	.50174	.31749	38
23	.49056	.30943	.49339	.31145	.49620	.31347	.49900	.31550	.50178	.31753	37
+ 6′	9.49061	.30946	9.49344	.31148	9.49625	.31351	9.49904	.31553	9.50183	.31756	36
25	.49066	.30950	.49348	.31152	.49629	.31354	.49909	.31557	.50187	.31760	35
26	.49071	.30953	.49353	.31155	.49634	.31357	.49914	.31560	.50192	.31763	34
27	.49075	.30957	.49358	.31158	.49639	.31361	.49918	.31563	.50197	.31766	33
+ 7′	9.49080	.30960	9.49362	.31162	9.49643	.31364	9.49923	.31567	9.50201	.31770	32
29	.49085	.30963	.49367	.31165	.49648	.31367	.49928	.31570	.50206	.31773	31
30	.49089	.30967	.49372	.31169	.49653	.31371	.49932	.31573	.50211	.31776	30
31	.49094	.30970	.49376	.31172	.49657	.31374	.49937	.31577	.50215	.31780	29
+ 8′	9.49099	.30973	9.49381	.31175	9.49662	.31378	9.49942	.31580	9.50220	.31783	28
33	.49104	.30977	.49386	.31179	.49467	.31381	.49946	.31584	.50224	.31787	27
34	.49108	.30980	.49390	.31182	.49671	.31384	.49951	.31587	.50229	.31790	26
35	.49113	.30983	.49395	.31185	.49676	.31388	.49956	.31590	.50234	.31793	25
+ 9′	9.49118	.30987	9.49400	.31189	9.49681	.31391	9.49960	.31594	9.50238	.31797	24
37	.49122	.30990	.49405	.31192	.49685	.31394	.49965	.31597	.50243	.31800	23
38	.49127	.30994	.49409	.31196	.49690	.31398	.49969	.31601	.50248	.31804	22
39	.49132	.30997	.49414	.31199	.49695	.31401	.49974	.31604	.50252	.31807	21
+ 10′	9.49137	.31000	9.49419	.31202	9.49699	.31405	9.49979	.31607	9.50257	.31810	20
41	.49141	.31004	.49423	.31206	.49704	.31408	.49983	.31611	.50261	.31814	19
42	.49146	.31007	.49428	.31209	.49709	.31411	.49988	.31614	.50266	.31817	18
43	.49151	.31010	.49433	.31212	.49713	.31415	.49993	.31617	.50271	.31820	17
+ 11′	9.49155	.31014	9.49437	.31216	9.49718	.31418	9.49997	.31621	9.50275	.31824	16
45	.49160	.31017	.49442	.31219	.49723	.31421	.50002	.31624	.50280	.31827	15
46	.49165	.31020	.49447	.31222	.49727	.31425	.50007	.31628	.50284	.31831	14
47	.49170	.31024	.49451	.31226	.49732	.31428	.50011	.31631	.50289	.31834	13
+ 12′	9.49174	.31027	9.49456	.31229	9.49737	.31432	9.50016	.31634	9.50294	.31837	12
49	.49179	.31031	.49461	.31233	.49741	.31435	.50021	.31638	.50298	.31841	11
50	.49184	.31034	.49465	.31236	.49746	.31438	.50025	.31641	.50303	.31844	10
51	.49188	.31037	.49470	.31239	.49751	.31442	.50030	.31644	.50308	.31848	9
+ 13′	9.49193	.31041	9.49475	.31243	9.49755	.31445	9.50034	.31648	9.50312	.31851	8
53	.49198	.31044	.49480	.31246	.49760	.31448	.50039	.31651	.50317	.31854	7
54	.49202	.31047	.49484	.31249	.49765	.31452	.50044	.31655	.50322	.31858	6
55	.49207	.31051	.49489	.31253	.49769	.31455	.50048	.31658	.50326	.31861	5
+ 14′	9.49212	.31054	9.49494	.31256	9.49774	.31459	9.50053	.31661	9.50331	.31865	4
57	.49217	.31057	.49498	.31260	.49779	.31462	.50058	.31665	.50335	.31868	3
58	.49221	.31061	.49503	.31263	.49783	.31465	.50062	.31668	.50340	.31871	2
59	.49226	.31064	.49508	.31266	.49788	.31469	.50067	.31672	.50345	.31875	1
+ 15′	9.49231	.31068	9.49512	.31270	9.49793	.31472	9.50072	.31675	9.50349	.31878	0
	$19^{h}\,29^{m}$		$19^{h}\,28^{m}$		$19^{h}\,27^{m}$		$19^{h}\,26^{m}$		$19^{h}\,25^{m}$		

TABLE 45.

Haversines.

s	$4^h 35^m$ **68° 45′**		$4^h 36^m$ **69° 0′**		$4^h 37^m$ **69° 15′**		$4^h 38^m$ **69° 30′**		$4^h 39^m$ **69° 45′**		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.50349	**.31878**	9.50626	**.32082**	9.50901	**.32285**	9.51174	**.32490**	9.51447	**.32694**	60
1	.50354	**.31881**	.50630	**.32085**	.50905	**.32289**	.51179	**.32493**	.51452	**.32698**	59
2	.50358	**.31885**	.50635	**.32088**	.50910	**.32292**	.51184	**.32496**	.51456	**.32701**	58
3	.50363	**.31888**	.50639	**.32092**	.50914	**.32296**	.51188	**.32500**	.51461	**.32704**	57
+ 1′	9.50368	**.31892**	9.50644	**.32095**	9.50919	**.32299**	9.51193	**.32503**	9.51465	**.32708**	56
5	.50372	**.31895**	.50649	**.32099**	.50924	**.32302**	.51197	**.32507**	.51470	**.32711**	55
6	.50377	**.31898**	.50653	**.32102**	.50928	**.32306**	.51202	**.32510**	.51474	**.32715**	54
7	.50382	**.31902**	.50658	**.32105**	.50933	**.32309**	.51206	**.32513**	.51479	**.32718**	53
+ 2′	9.50386	**.31905**	9.50662	**.32109**	9.50937	**.32313**	9.51211	**.32517**	9.51483	**.32721**	52
9	.50391	**.31909**	.50667	**.32112**	.50942	**.32316**	.51215	**.32520**	.51488	**.32725**	51
10	.50395	**.31912**	.50672	**.32116**	.50946	**.32319**	.51220	**.32524**	.51492	**.32728**	50
11	.50400	**.31915**	.50676	**.32119**	.50951	**.32323**	.51225	**.32527**	.51497	**.32732**	49
+ 3′	9.50405	**.31919**	9.50681	**.32122**	9.50956	**.32326**	9.51229	**.32531**	9.51501	**.32735**	48
13	.50409	**.31922**	.50685	**.32120**	.50960	**.32330**	.51234	**.32534**	.51506	**.32738**	47
14	.50414	**.31926**	.50690	**.32129**	.50965	**.32333**	.51238	**.32537**	.51510	**.32742**	46
15	.50418	**.31929**	.50694	**.32133**	.50969	**.32336**	.51243	**.32541**	.51515	**.32745**	45
+ 4′	9.50423	**.31932**	9.50699	**.32136**	9.50974	**.32340**	9.51247	**.32544**	9.51519	**.32749**	44
17	.50428	**.31936**	.50704	**.32139**	.50978	**.32343**	.51252	**.32547**	.51524	**.32752**	43
18	.50432	**.31939**	.50708	**.32143**	.50983	**.32347**	.51256	**.32551**	.51529	**.32756**	42
19	.50437	**.31942**	.50713	**.32146**	.50988	**.32350**	.51261	**.32554**	.51533	**.32759**	41
+ 5′	9.50442	**.31946**	9.50717	**.32150**	9.50992	**.32353**	9.51265	**.32558**	9.51538	**.32762**	40
21	.50446	**.31949**	.50722	**.32153**	.50997	**.32357**	.51270	**.32561**	.51542	**.32766**	39
22	.50451	**.31953**	.50727	**.32156**	.51001	**.32360**	.51275	**.32565**	.51547	**.32769**	38
23	.50455	**.31956**	.50731	**.32160**	.51006	**.32364**	.51279	**.32568**	.51551	**.32773**	37
+ 6′	9.50460	**.31959**	9.50736	**.32163**	9.51010	**.32367**	9.51284	**.32571**	9.51556	**.32776**	36
25	.50465	**.31963**	.50740	**.32166**	.51015	**.32370**	.51288	**.32575**	.51560	**.32779**	35
26	.50469	**.31966**	.50745	**.32170**	.51019	**.32374**	.51293	**.32578**	.51565	**.32783**	34
27	.50474	**.31970**	.50750	**.32173**	.51024	**.32377**	.51297	**.32582**	.51569	**.32786**	33
+ 7′	9.50478	**.31973**	9.50754	**.32177**	9.51029	**.32381**	9.51302	**.32585**	9.51574	**.32790**	32
29	.50483	**.31976**	.50759	**.32180**	.51033	**.32384**	.51306	**.32588**	.51578	**.32793**	31
30	.50488	**.31980**	.50763	**.32183**	.51038	**.32388**	.51311	**.32592**	.51583	**.32797**	30
31	.50492	**.31983**	.50768	**.32187**	.51042	**.32391**	.51315	**.32595**	.51587	**.32800**	29
+ 8′	9.50497	**.31987**	9.50772	**.32190**	9.51047	**.32394**	9.51320	**.32599**	9.51592	**.32803**	28
33	.50501	**.31990**	.50777	**.32194**	.51051	**.32398**	.51325	**.32602**	.51596	**.32807**	27
34	.50506	**.31993**	.50782	**.32197**	.51056	**.32401**	.51329	**.32605**	.51601	**.32810**	26
35	.50511	**.31997**	.50786	**.32200**	.51061	**.32405**	.51334	**.32609**	.51605	**.32814**	25
+ 9′	9.50515	**.32000**	9.50791	**.32204**	9.51065	**.32408**	9.51338	**.32612**	9.51610	**.32817**	24
37	.50520	**.32004**	.50795	**.32207**	.51070	**.32411**	.51343	**.32616**	.51614	**.32820**	23
38	.50524	**.32007**	.50800	**.32211**	.51074	**.32415**	.51347	**.32619**	.51619	**.32824**	22
39	.50529	**.32010**	.50805	**.32214**	.51079	**.32418**	.51352	**.32623**	.51623	**.32827**	21
+ 10′	9.50534	**.32014**	9.50809	**.32217**	9.51083	**.32422**	9.51356	**.32626**	9.51628	**.32831**	20
41	.50538	**.32017**	.50814	**.32221**	.51088	**.32425**	.51361	**.32629**	.51633	**.32834**	19
42	.50543	**.32021**	.50818	**.32224**	.51092	**.32428**	.51365	**.32633**	.51637	**.32838**	18
43	.50547	**.32024**	.50823	**.32228**	.51097	**.32432**	.51370	**.32636**	.51642	**.32841**	17
+ 11′	9.50552	**.32027**	9.50827	**.32231**	9.51102	**.32435**	9.51374	**.32640**	9.51646	**.32844**	16
45	.50557	**.32031**	.50832	**.32235**	.51106	**.32438**	.51379	**.32643**	.51651	**.32848**	15
46	.50561	**.32034**	.50837	**.32238**	.51111	**.32442**	.51384	**.32646**	.51655	**.32851**	14
47	.50566	**.32037**	.50841	**.32241**	.51115	**.32445**	.51388	**.32650**	.51660	**.32855**	13
+ 12′	9.50570	**.32041**	9.50846	**.32245**	9.51120	**.32449**	9.51393	**.32653**	9.51664	**.32858**	12
49	.50575	**.32044**	.50850	**.32248**	.51124	**.32452**	.51397	**.32657**	.51669	**.32861**	11
50	.50580	**.32048**	.50855	**.32251**	.51129	**.32456**	.51402	**.32660**	.51673	**.32865**	10
51	.50584	**.32051**	.50860	**.32255**	.51133	**.32459**	.51406	**.32663**	.51678	**.32868**	9
+ 13′	9.50589	**.32054**	9.50864	**.32258**	9.51138	**.32462**	9.51411	**.32667**	9.51682	**.32872**	8
53	.50593	**.32058**	.50869	**.32262**	.51143	**.32466**	.51415	**.32670**	.51687	**.32875**	7
54	.50598	**.32061**	.50873	**.32265**	.31147	**.32469**	.51420	**.32674**	.51691	**.32878**	6
55	.50603	**.32065**	.50878	**.32268**	.51152	**.32473**	.51424	**.32677**	.51696	**.32882**	5
+ 14′	9.50607	**.32068**	9.50882	**.32272**	9.51156	**.32476**	9.51429	**.32681**	9.51700	**.32885**	4
57	.50612	**.32071**	.50887	**.32275**	.51161	**.32479**	.51433	**.32684**	.51705	**.32889**	3
58	.50616	**.32075**	.50892	**.32279**	.51165	**.32483**	.51438	**.32687**	.51709	**.32892**	2
59	.50621	**.32078**	.50896	**.32282**	.51170	**.32486**	.51442	**.32691**	.51714	**.32896**	1
+ 15′	9.50626	**.32082**	9.50901	**.32285**	9.51174	**.32490**	9.51447	**.32694**	9.51718	**.32899**	0
	$19^h 24^m$		$19^h 23^m$		$19^h 22^m$		$19^h 21^m$		$19^h 20^m$		

TABLE 45.

Haversines.

s	$4^h\,40^m$ 70° 0′		$4^h\,41^m$ 70° 15′		$4^h\,42^m$ 70° 30′		$4^h\,43^m$ 70° 45′		$4^h\,44^m$ 71° 0′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.51718	**.32899**	9.51988	**.33104**	9.52257	**.33310**	9.52525	**.33515**	9.52791	**.33722**	60
1	.51723	**.32902**	.51993	**.33108**	.52261	**.33313**	.52529	**.33519**	.52795	**.33725**	59
2	.51727	**.32906**	.51997	**.33111**	.52266	**.33317**	.52533	**.33522**	.52800	**.33728**	58
3	.51732	**.32909**	.52002	**.33114**	.52270	**.33320**	.52538	**.33526**	.52804	**.33732**	57
+ 1′	9.51736	**.32913**	9.52006	**.33118**	9.52275	**.33323**	9.52542	**.33529**	9.52809	**.33735**	56
5	.51741	**.32916**	.52011	**.33121**	.52279	**.33327**	.52547	**.33533**	.52813	**.33739**	55
6	.51745	**.32920**	.52015	**.33125**	.52284	**.33330**	.52551	**.33536**	.52817	**.33742**	54
7	.51750	**.32923**	.52020	**.33128**	.52288	**.33334**	.52556	**.33540**	.52822	**.33746**	53
+ 2′	9.51754	**.32926**	9.52024	**.33132**	9.52293	**.33337**	9.52560	**.33543**	9.52826	**.33749**	52
9	.51759	**.32930**	.52029	**.33135**	.52297	**.33341**	.52565	**.33546**	.52831	**.33753**	51
10	.51763	**.32933**	.52033	**.33138**	.52302	**.33344**	.52569	**.33550**	.52835	**.33756**	50
11	.51768	**.32937**	.52038	**.33142**	.52306	**.33347**	.52573	**.33553**	.52839	**.33759**	49
+ 3′	9.51772	**.32940**	9.52042	**.33145**	9.52311	**.33351**	9.52578	**.33557**	9.52844	**.33763**	48
13	.51777	**.32943**	.52047	**.33149**	.52315	**.33354**	.52582	**.33560**	.52848	**.33766**	47
14	.51781	**.32947**	.52051	**.33152**	.52320	**.33358**	.52587	**.33564**	.52853	**.33770**	46
15	.51786	**.32950**	.52056	**.33156**	.52324	**.33361**	.52591	**.33567**	.52857	**.33773**	45
+ 4′	9.51790	**.32954**	9.52060	**.33159**	9.52328	**.33365**	9.52596	**.33570**	9.52862	**.33777**	44
17	.51795	**.32957**	.52065	**.33162**	.52333	**.33368**	.52600	**.33574**	.52866	**.33780**	43
18	.51799	**.32961**	.52069	**.33166**	.52337	**.33371**	.52605	**.33577**	.52870	**.33783**	42
19	.51804	**.32964**	.52074	**.33169**	.52342	**.33375**	.52609	**.33581**	.52875	**.33787**	41
+ 5′	9.51808	**.32967**	9.52078	**.33173**	9.52346	**.33378**	9.52613	**.33584**	9.52879	**.33790**	40
21	.51813	**.32971**	.52082	**.33176**	.52351	**.33382**	.52618	**.33588**	.52884	**.33794**	39
22	.51817	**.32974**	.52087	**.33179**	.52355	**.33385**	.52622	**.33591**	.52888	**.33797**	38
23	.51822	**.32978**	.52091	**.33183**	.52360	**.33389**	.52627	**.33594**	.52893	**.33801**	37
+ 6′	9.51826	**.32981**	9.52096	**.33186**	9.52364	**.33392**	9.52631	**.33598**	9.52897	**.33804**	36
25	.51831	**.32984**	.52100	**.33190**	.52369	**.33395**	.52636	**.33601**	.52901	**.33808**	35
26	.51835	**.32988**	.52105	**.33193**	.52373	**.33399**	.52640	**.33605**	.52906	**.33811**	34
27	.51840	**.32991**	.52109	**.33197**	.52378	**.33402**	.52645	**.33608**	.52910	**.33814**	33
+ 7′	9.51844	**.32995**	9.52114	**.33200**	9.52382	**.33406**	9.52649	**.33612**	9.52915	**.33818**	32
29	.51849	**.32998**	.52118	**.33203**	.52386	**.33409**	.52653	**.33615**	.52919	**.33821**	31
30	.51853	**.33002**	.52123	**.33207**	.52391	**.33413**	.52658	**.33618**	.52923	**.33825**	30
31	.51858	**.33005**	.52127	**.33210**	.52395	**.33416**	.52662	**.33622**	.52928	**.33828**	29
+ 8′	9.51862	**.33008**	9.52132	**.33214**	9.52400	**.33419**	9.52667	**.33625**	9.52932	**.33832**	28
33	.51867	**.33012**	.52136	**.33217**	.52404	**.33423**	.52671	**.33629**	.52937	**.33835**	27
34	.51871	**.33015**	.52141	**.33221**	.52409	**.33426**	.52676	**.33632**	.52941	**.33839**	26
35	.51876	**.33019**	.52145	**.33224**	.52413	**.33430**	.52680	**.33636**	.52946	**.33842**	25
+ 9′	9.51880	**.33022**	9.52150	**.33227**	9.52418	**.33433**	9.52684	**.33639**	9.52950	**.33845**	24
37	.51885	**.33025**	.52154	**.33231**	.52422	**.33436**	.52689	**.33642**	.52954	**.33849**	23
38	.51889	**.33029**	.52159	**.33234**	.52427	**.33440**	.52693	**.33646**	.52959	**.33852**	22
39	.51894	**.33032**	.52163	**.33238**	.52431	**.33444**	.52698	**.33649**	.52963	**.33856**	21
+ 10′	9.51898	**.33036**	9.52168	**.33241**	9.52436	**.33447**	9.52702	**.33653**	9.52968	**.33859**	20
41	.51903	**.33039**	.52172	**.33245**	.52440	**.33450**	.52707	**.33656**	.52972	**.33863**	19
42	.51907	**.33043**	.52177	**.33248**	.52444	**.33454**	.52711	**.33660**	.52976	**.33866**	18
43	.51912	**.33046**	.52181	**.33251**	.52449	**.33457**	.52715	**.33663**	.52981	**.33869**	17
+ 11′	9.51916	**.33049**	9.52185	**.33255**	9.52453	**.33461**	9.52720	**.33667**	9.52985	**.33873**	16
45	.51921	**.33053**	.52190	**.33258**	.52458	**.33464**	.52724	**.33670**	.52990	**.33876**	15
46	.51925	**.33056**	.52194	**.33262**	.52462	**.33467**	.52729	**.33673**	.52994	**.33880**	14
47	.51930	**.33060**	.52199	**.33265**	.52467	**.33471**	.52733	**.33677**	.52999	**.33883**	13
+ 12′	9.51934	**.33063**	9.52203	**.33269**	9.52471	**.33474**	9.52738	**.33680**	9.53003	**.33887**	12
49	.51939	**.33067**	.52208	**.33272**	.52476	**.33478**	.52742	**.33684**	.53007	**.33890**	11
50	.51943	**.33070**	.52212	**.33275**	.52480	**.33481**	.52747	**.33687**	.53012	**.33894**	10
51	.51948	**.33073**	.52217	**.33279**	.52484	**.33485**	.52751	**.33691**	.53016	**.33897**	9
+ 13′	9.51952	**.33077**	9.52221	**.33282**	9.52489	**.33488**	9.52755	**.33694**	9.53021	**.33900**	8
53	.51957	**.33080**	.52226	**.33286**	.52493	**.33491**	.52760	**.33698**	.53025	**.33904**	7
54	.51961	**.33084**	.52230	**.33289**	.52498	**.33495**	.52764	**.33701**	.53029	**.33907**	6
55	.51966	**.33087**	.52235	**.33293**	.52502	**.33498**	.52769	**.33704**	.53034	**.33911**	5
+ 14′	9.51970	**.33090**	9.52239	**.33296**	9.52507	**.33502**	9.52773	**.33708**	9.53038	**.33914**	4
57	.51975	**.33094**	.52244	**.33299**	.52511	**.33505**	.52778	**.33711**	.53043	**.33918**	3
58	.51979	**.33097**	.52248	**.33303**	.52516	**.33509**	.52782	**.33715**	.53047	**.33921**	2
59	.51984	**.33101**	.52253	**.33306**	.52520	**.33512**	.52786	**.33718**	.53051	**.33925**	1
+ 15′	9.51988	**.33104**	9.52257	**.33310**	9.52525	**.33515**	9.52791	**.33722**	9.53056	**.33928**	0
	$19^h\,19^m$		$19^h\,18^m$		$19^h\,17^m$		$19^h\,16^m$		$19^h\,15^m$		

TABLE 45.

Haversines.

s	$5^h\ 45^m$ 71° 15′		$4^h\ 46^m$ 71° 30′		$4^h\ 47^m$ 71° 45′		$4^h\ 48^m$ 72° 0′		$4^h\ 49^m$ 72° 15′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.53056	.33928	9.53320	.34135	9.53582	.34342	9.53844	.34549	9.54104	.34757	60
1	.53060	.33931	.53324	.34138	.53587	.34345	.53848	.34553	.54108	.34760	59
2	.53065	.33935	.53328	.34142	.53591	.34349	.53852	.34556	.54113	.34764	58
3	.53069	.33938	.53333	.34145	.53595	.34352	.53857	.34560	.54117	.34767	57
+ 1′	9.53073	.33942	9.53337	.34149	9.53600	.34356	9.53861	.34563	9.54121	.34771	56
5	.53078	.33945	.53342	.34152	.53604	.34359	.53865	.34566	.54126	.34774	55
6	.53082	.33949	.53346	.34155	.53609	.34363	.53870	.34570	.54130	.34778	54
7	.53087	.33952	.53350	.34159	.53613	.34366	.53874	.34573	.54134	.34781	53
+ 2′	9.53091	.33956	9.53355	.34162	9.53617	.34369	9.53879	.34577	9.54139	.34784	52
9	.53096	.33959	.53359	.34166	.53622	.34373	.53883	.34580	.54143	.34788	51
10	.53100	.33962	.53364	.34169	.53626	.34376	.53887	.34584	.54147	.34791	50
11	.53104	.33966	.53368	.34173	.53630	.34380	.53892	.34587	.54152	.34795	49
+ 3′	9.53109	.33969	9.53372	.34176	9.53635	.34383	9.53896	.34591	9.54156	.34798	48
13	.53113	.33973	.53377	.34180	.53639	.34387	.53900	.34594	.54160	.34802	47
14	.53118	.33976	.53381	.34183	.53643	.34390	.53905	.34598	.54165	.34805	46
15	.53122	.33980	.53385	.34186	.53648	.34394	.53909	.34601	.54169	.34809	45
+ 4′	9.53126	.33983	9.53390	.34190	9.53652	.34397	9.53913	.34604	9.54173	.34812	44
17	.53131	.33986	.53394	.34193	.53657	.34400	.53918	.34608	.54177	.34816	43
18	.53135	.33990	.53399	.34197	.53661	.34404	.53922	.34611	.54182	.34819	42
19	.53140	.33993	.53403	.34200	.53665	.34407	.53926	.34615	.54186	.34823	41
+ 5′	9.53144	.33997	9.53407	.34204	9.53670	.34411	9.53931	.34618	9.54190	.34826	40
21	.53148	.34000	.53412	.34207	.53674	.34414	.53935	.34622	.54195	.34830	39
22	.53153	.34004	.53416	.34211	.53678	.34418	.53939	.34625	.54199	.34833	38
23	.53157	.34007	.53421	.34214	.53683	.34421	.53944	.34629	.54203	.34830	37
+ 6′	9.53162	.34011	9.53425	.34218	9.53687	.34425	9.53948	.34632	9.54208	.34840	36
25	.53166	.34014	.53429	.34221	.53691	.34428	.53952	.34636	.54212	.34843	35
26	.53170	.34018	.53434	.34224	.53696	.34432	.53957	.34639	.54216	.34847	34
27	.53175	.34021	.53438	.34228	.53700	.34435	.53961	.34643	.54221	.34850	33
+ 7′	9.53179	.34024	9.53442	.34231	9.53704	.34439	9.53966	.34646	9.54225	.34854	32
29	.53184	.34028	.53447	.34235	.53709	.34442	.53970	.34649	.54229	.34857	31
30	.53188	.34031	.53451	.34238	.53713	.34445	.53974	.34653	.54234	.34861	30
31	.53192	.34035	.53456	.34242	.53718	.34449	.53978	.34656	.54238	.34864	29
+ 8′	9.53197	.34038	9.53460	.34245	9.53722	.34452	9.53983	.34660	9.54242	.34868	28
33	.53201	.34042	.53464	.34249	.53726	.34456	.53987	.34663	.54247	.34871	27
34	.53206	.34045	.53469	.34252	.53731	.34459	.53991	.34667	.54251	.34875	26
35	.53210	.34049	.53473	.34256	.53735	.34463	.53996	.34670	.54255	.34878	25
+ 9′	9.53214	.34052	9.53477	.34259	9.53739	.34466	9.54000	.34674	9.54260	.34882	24
37	.53219	.34055	.53482	.34262	.53744	.34470	.54004	.34677	.54264	.34885	23
38	.53223	.34059	.53486	.34266	.53748	.34473	.54009	.34681	.54268	.34888	22
39	.53228	.34062	.53491	.34269	.53752	.34477	.54013	.34684	.54272	.34892	21
+ 10′	9.53232	.34066	9.53495	.34273	9.53757	.34480	9.54017	.34688	9.54277	.34895	20
41	.53236	.34069	.53499	.34276	.53761	.34483	.54022	.34691	.54281	.34899	19
42	.53241	.34073	.53504	.34280	.53765	.34487	.54026	.34694	.54285	.34902	18
43	.53245	.34076	.53508	.34283	.53770	.34490	.54030	.34698	.54290	.34906	17
+ 11′	9.53249	.34080	9.53512	.34287	9.53774	.34494	9.54035	.34701	9.54294	.34909	16
45	.53254	.34083	.53517	.34290	.53778	.34497	.54039	.34705	.54298	.34913	15
46	.53258	.34087	.53521	.34293	.53783	.34501	.54043	.34708	.54303	.34916	14
47	.53263	.34090	.53526	.34297	.53787	.34504	.54048	.34712	.54307	.34920	13
+ 12′	9.53267	.34093	9.53530	.34300	9.53792	.34508	9.54052	.34715	9.54311	.34923	12
49	.53271	.34097	.53534	.34304	.53796	.34511	.54056	.34719	.54316	.34927	11
50	.53276	.34100	.53539	.34307	.53800	.34515	.54061	.34722	.54320	.34930	10
51	.53280	.34104	.53543	.34311	.53805	.34518	.54065	.34726	.54324	.34933	9
+ 13′	9.53285	.34107	9.53547	.34314	9.53809	.34521	9.54069	.34729	9.54329	.34937	8
53	.53289	.34111	.53552	.34318	.53813	.34525	.54074	.34733	.54333	.34940	7
54	.53293	.34114	.53556	.34321	.53818	.34528	.54078	.34736	.54337	.34944	6
55	.53298	.34118	.53560	.34325	.53822	.34532	.54082	.34739	.54341	.34947	5
+ 14′	9.53302	.34121	9.53565	.34328	9.53826	.34535	9.54087	.34743	9.54346	.34951	4
57	.53307	.34124	.53569	.34331	.53831	.34539	.54091	.34746	.54350	.34954	3
58	.53311	.34128	.53574	.34335	.53835	.34542	.54095	.34750	.54354	.34958	2
59	.53315	.34131	.53578	.34338	.53839	.34546	.54100	.34753	.54359	.34961	1
+ 15′	9.53320	.34135	9.53582	.34342	9.53844	.34549	9.54104	.34757	9.54363	.34965	0
	$19^h\ 14^m$		$19^h\ 13^m$		$19^h\ 12^m$		$19^h\ 11^m$		$19^h\ 10^m$		

TABLE 45.

Haversines.

s	$4^h\ 50^m$ 72° 30′		$4^h\ 51^m$ 72° 45′		$4^h\ 52^m$ 73° 0′		$4^h\ 53^m$ 73° 15′		$4^h\ 54^m$ 73° 30′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.54363	**.34965**	9.54621	**.35173**	9.54878	**.35381**	9.55133	**.35590**	9.55387	**.35799**	60
1	.54367	**.34968**	.54625	**.35176**	.54882	**.35385**	.55137	**.35594**	.55392	**.35803**	59
2	.54372	**.34972**	.54629	**.35180**	.54886	**.35388**	.55142	**.35597**	.55396	**.35806**	58
3	.54376	**.34975**	.54634	**.35183**	.54890	**.35392**	.55146	**.35601**	.55400	**.35810**	57
+ 1′	9.54380	**.34979**	9.54638	**.35187**	9.54895	**.35395**	9.55150	**.35604**	9.55404	**.35813**	56
5	.54385	**.34982**	.54642	**.35190**	.54899	**.35399**	.55154	**.35608**	.55409	**.35817**	55
6	.54389	**.34986**	.54647	**.35194**	.54903	**.35402**	.55159	**.35611**	.55413	**.35820**	54
7	.54393	**.34989**	.54651	**.35197**	.54907	**.35406**	.55163	**.35615**	.55417	**.35824**	53
+ 2′	9.54397	**.34992**	9.54655	**.35201**	9.54912	**.35409**	9.55167	**.35618**	9.55421	**.35827**	52
9	.54402	**.34996**	.54659	**.35204**	.54916	**.35413**	.55171	**.35622**	.55425	**.35831**	51
10	.54406	**.34999**	.54664	**.35208**	.54920	**.35416**	.55176	**.35625**	.55430	**.35834**	50
11	.54410	**.35003**	.54668	**.35211**	.54924	**.35420**	.55180	**.35628**	.55434	**.35838**	49
+ 3′	9.54415	**.35006**	9.54672	**.35215**	9.54929	**.35423**	9.55184	**.35632**	9.55438	**.35841**	48
13	.54419	**.35010**	.54677	**.35218**	.54933	**.35427**	.55188	**.35635**	.55442	**.35845**	47
14	.54423	**.35013**	.54681	**.35222**	.54937	**.35430**	.55192	**.35639**	.55447	**.35848**	46
15	.54428	**.35017**	.54685	**.35225**	.54942	**.35434**	.55197	**.35642**	.55451	**.35852**	45
+ 4′	9.54432	**.35020**	9.54689	**.35228**	9.54946	**.35437**	9.55201	**.35646**	9.55455	**.35855**	44
17	.54436	**.35024**	.54694	**.35232**	.54950	**.35441**	.55205	**.35649**	.55459	**.35859**	43
18	.54440	**.35027**	.54698	**.35235**	.54954	**.35444**	.55209	**.35653**	.55463	**.35862**	42
19	.54445	**.35031**	.54702	**.35239**	.54959	**.35448**	.55214	**.35656**	.55468	**.35865**	41
+ 5′	9.54449	**.35034**	9.54707	**.35242**	9.54963	**.35451**	9.55218	**.35660**	9.55472	**.35869**	40
21	.54453	**.35038**	.54711	**.35246**	.54967	**.35454**	.55222	**.35663**	.55476	**.35872**	39
22	.54458	**.35041**	.54715	**.35249**	.54971	**.35458**	.55226	**.35667**	.55480	**.35876**	38
23	.54462	**.35044**	.54719	**.35253**	.54976	**.35461**	.55231	**.35670**	.55485	**.35879**	37
+ 6′	9.54466	**.35048**	9.54724	**.35256**	9.54980	**.35465**	9.55235	**.35674**	9.55489	**.35883**	36
25	.54471	**.35051**	.54728	**.35260**	.54984	**.35468**	.55239	**.35677**	.55493	**.35886**	35
26	.54475	**.35055**	.54732	**.35263**	.54988	**.35472**	.55243	**.35681**	.55497	**.35890**	34
27	.54479	**.35058**	.54736	**.35267**	.54993	**.35475**	.55248	**.35684**	.55501	**.35893**	33
+ 7′	9.54483	**.35062**	9.54741	**.35270**	9.54997	**.35479**	9.55252	**.35688**	9.55506	**.35897**	32
29	.54488	**.35065**	.54745	**.35274**	.55001	**.35482**	.55256	**.35691**	.55510	**.35900**	31
30	.54492	**.35069**	.54749	**.35277**	.55005	**.35486**	.55260	**.35695**	.55514	**.35904**	30
31	.54496	**.35072**	.54754	**.35281**	.55010	**.35489**	.55265	**.35698**	.55518	**.35907**	29
+ 8′	9.54501	**.35076**	9.54758	**.35284**	9.55014	**.35493**	9.55269	**.35702**	9.55523	**.35911**	28
33	.54505	**.35079**	.54762	**.35288**	.55018	**.35496**	.55273	**.35705**	.55527	**.35914**	27
34	.54509	**.35083**	.54766	**.35291**	.55022	**.35500**	.55277	**.35709**	.55531	**.35918**	26
35	.54514	**.35086**	.54771	**.35294**	.55027	**.35503**	.55282	**.35712**	.55535	**.35921**	25
+ 9′	9.54518	**.35090**	9.54775	**.35298**	9.55031	**.35507**	9.55286	**.35716**	9.55539	**.35925**	24
37	.54522	**.35093**	.54779	**.35301**	.55035	**.35510**	.55290	**.35719**	.55544	**.35928**	23
38	.54526	**.35097**	.54784	**.35305**	.55039	**.35514**	.55294	**.35723**	.55548	**.35932**	22
39	.54531	**.35100**	.54788	**.35308**	.55044	**.35517**	.55298	**.35726**	.55552	**.35935**	21
+ 10′	9.54535	**.35103**	9.54792	**.35312**	9.55048	**.35521**	9.55303	**.35730**	9.55556	**.35939**	20
41	.54539	**.35107**	.54796	**.35315**	.55052	**.35524**	.55307	**.35733**	.55561	**.35942**	19
42	.54544	**.35110**	.54801	**.35319**	.55057	**.35528**	.55311	**.35737**	.55565	**.35946**	18
43	.54548	**.35114**	.54805	**.35322**	.55061	**.35531**	.55315	**.35740**	.55569	**.35949**	17
+ 11′	9.54552	**.35117**	9.54809	**.35326**	9.55065	**.35534**	9.55320	**.35743**	9.55573	**.35953**	16
45	.54556	**.35121**	.54813	**.35329**	.55069	**.35538**	.55324	**.35747**	.55577	**.35956**	15
46	.54561	**.35124**	.54818	**.35333**	.55074	**.35541**	.55328	**.35750**	.55582	**.35960**	14
47	.54565	**.35128**	.54822	**.35336**	.55078.	**.35545**	.55332	**.35754**	.55586	**.35963**	13
+ 12′	9.54569	**.35131**	9.54826	**.35340**	9.55082	**.35548**	9.55337	**.35757**	9.55590	**.35967**	12
49	.54574	**.35135**	.54831	**.35343**	.55086	**.35552**	.55341	**.35761**	.55594	**.35970**	11
50	.54578	**.35138**	.54835	**.35347**	.55091	**.35555**	.55345	**.35764**	.55598	**.35974**	10
51	.54582	**.35142**	.54839	**.35350**	.55095	**.35559**	.55349	**.35768**	.55603	**.35977**	9
+ 13′	9.54587	**.35145**	9.54843	**.35354**	9.55099	**.35562**	9.55354	**.35771**	9.55607	**.35981**	8
53	.54591	**.35149**	.54848	**.35357**	.55103	**.35566**	.55358	**.35775**	.55611	**.35984**	7
54	.54595	**.35152**	.54852	**.35361**	.55108	**.35569**	.55362	**.35778**	.55615	**.35988**	6
55	.54599	**.35156**	.54856	**.35364**	.55112	**.35573**	.55366	**.35782**	.55620	**.35991**	5
+ 14′	9.54604	**.35159**	9.54860	**.35368**	9.55116	**.35576**	9.55370	**.35785**	9.55624	**.35995**	4
57	.54608	**.35162**	.54865	**.35371**	.55120	**.35580**	.55375	**.35789**	.55628	**.35998**	3
58	.54612	**.35166**	.54869	**.35374**	.55125	**.35583**	.55379	**.35792**	.55632	**.36002**	2
59	.54617	**.35169**	.54873	**.35378**	.55129	**.35587**	.55383	**.35796**	.55636	**.36005**	1
+ 15′	9.54621	**.35173**	9.54878	**.35381**	9.55133	**.35590**	9.55387	**.35799**	9.55641	**.36009**	0
	$19^h\ 9^m$		$19^h\ 8^m$		$19^h\ 7^m$		$19^h\ 6^m$		$19^h\ 5^m$		

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TABLE 45.

Haversines.

s	$4^h\ 55^m$ 73° 45′		$4^h\ 56^m$ 74° 0′		$4^h\ 57^m$ 74° 15′		$4^h\ 58^m$ 74° 30′		$4^h\ 59^m$ 74° 45′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.55641	**.36009**	9.55893	**.36218**	9.56144	**.36428**	9.56393	**.36638**	9.56642	**.36848**	*60*
1	.55645	**.36012**	.55897	**.36222**	.56148	**.36431**	.56397	**.36642**	.56646	**.36852**	*59*
2	.55649	**.36016**	.55901	**.36225**	.56152	**.36435**	.56402	**.36645**	.56650	**.36855**	*58*
3	.55653	**.36019**	.55905	**.36229**	.56156	**.36438**	.56406	**.36649**	.56654	**.36859**	*57*
+ 1′	9.55657	**.36023**	9.55909	**.36232**	9.56160	**.36442**	9.56410	**.36652**	9.56658	**.36862**	*56*
5	.55662	**.36026**	.55914	**.36236**	.56164	**.36445**	.56414	**.36656**	.56663	**.36866**	*55*
6	.55666	**.36030**	.55918	**.36239**	.56169	**.36449**	.56418	**.36659**	.56667	**.36869**	*54*
7	.55670	**.36033**	.55922	**.36243**	.56173	**.36452**	.56422	**.36663**	.56671	**.36873**	*53*
+ 2′	9.55674	**.36036**	9.55926	**.36246**	9.56177	**.36456**	9.56426	**.36666**	9.56675	**.36877**	*52*
9	.55678	**.36040**	.55930	**.36250**	.56181	**.36459**	.56431	**.36670**	.56679	**.36880**	*51*
10	.55683	**.36043**	.55935	**.36253**	.56185	**.36463**	.56435	**.36673**	.56683	**.36884**	*50*
11	.55687	**.36047**	.55939	**.36257**	.56189	**.36466**	.56439	**.36677**	.56687	**.36887**	*49*
+ 3′	9.55691	**.36050**	9.55943	**.36260**	9.56194	**.36470**	9.56443	**.36680**	9.56692	**.36891**	*48*
13	.55695	**.36054**	.55947	**.36264**	.56198	**.36473**	.56447	**.36684**	.56696	**.36894**	*47*
14	.55699	**.36057**	.55951	**.36267**	.56202	**.36477**	.56451	**.36687**	.56700	**.36898**	*46*
15	.55704	**.36061**	.55955	**.36271**	.56206	**.36480**	.56456	**.36691**	.56704	**.36901**	*45*
+ 4′	9.55708	**.36064**	9.55960	**.36274**	9.56210	**.36484**	9.56460	**.36694**	9.56708	**.36905**	*44*
17	.55712	**.36068**	.55964	**.36278**	.56214	**.36487**	.56464	**.36698**	.56712	**.36908**	*43*
18	.55716	**.36071**	.55968	**.36281**	.56219	**.36491**	.56468	**.36701**	.56716	**.36912**	*42*
19	.55721	**.36075**	.55972	**.36285**	.56223	**.36494**	.56472	**.36705**	.56720	**.36915**	*41*
+ 5′	9.55725	**.36078**	9.55976	**.36288**	9.56227	**.36498**	9.56476	**.36708**	9.56725	**.36919**	*40*
21	.55729	**.36082**	.55981	**.36292**	.56231	**.36501**	.56480	**.36712**	.56729	**.36922**	*39*
22	.55733	**.36085**	.55985	**.36295**	.56235	**.36505**	.56485	**.36715**	.56733	**.36926**	*38*
23	.55737	**.36089**	.55989	**.36299**	.56239	**.36508**	.56489	**.36719**	.56737	**.36929**	*37*
+ 6′	9.55742	**.36092**	9.55993	**.36302**	9.56244	**.36512**	9.56493	**.36722**	9.56741	**.36933**	*36*
25	.55746	**.36096**	.55997	**.36306**	.56248	**.36515**	.56497	**.36726**	.56745	**.36936**	*35*
26	.55750	**.36099**	.56001	**.36309**	.56252	**.36519**	.56501	**.36729**	.56749	**.36940**	*34*
27	.55754	**.36103**	.56006	**.36313**	.56256	**.36522**	.56505	**.36733**	.56753	**.36943**	*33*
+ 7′	9.55758	**.36106**	9.56010	**.36316**	9.56260	**.36526**	9.56509	**.36736**	9.56758	**.36947**	*32*
29	.55763	**.36110**	.56014	**.36320**	.56264	**.36529**	.56514	**.36740**	.56762	**.36950**	*31*
30	.55767	**.36113**	.56018	**.36323**	.56269	**.36533**	.56518	**.36743**	.56766	**.36954**	*30*
31	.55771	**.36117**	.56022	**.36327**	.56273	**.36536**	.56522	**.36747**	.56770	**.36957**	*29*
+ 8′	9.55775	**.36120**	9.56027	**.36330**	9.56277	**.36540**	9.56526	**.36750**	9.56774	**.36961**	*28*
33	.55779	**.36124**	.56031	**.36334**	.56281	**.36543**	.56530	**.36754**	.56778	**.36964**	*27*
34	.55784	**.36127**	.56035	**.36337**	.56285	**.36547**	.56534	**.36757**	.56782	**.36968**	*26*
35	.55788	**.36131**	.56039	**.36341**	.56289	**.36551**	.56538	**.36761**	.56786	**.36971**	*25*
+ 9′	9.55792	**.36134**	9.56043	**.36344**	9.56294	**.36554**	9.56543	**.36764**	9.56791	**.36975**	*24*
37	.55796	**.36138**	.56047	**.36348**	.56298	**.36558**	.56547	**.36768**	.56795	**.36978**	*23*
38	.55800	**.36141**	.56052	**.36351**	.56302	**.36561**	.56551	**.36771**	.56799	**.36982**	*22*
39	.55805	**.36145**	.56056	**.36355**	.56306	**.36565**	.56555	**.36775**	.56803	**.36985**	*21*
+ 10′	9.55809	**.36148**	9.56060	**.36358**	9.56310	**.36568**	9.56559	**.36778**	9.56807	**.36989**	*20*
41	.55813	**.36152**	.56064	**.36362**	.56314	**.36572**	.56563	**.36782**	.56811	**.36992**	*19*
42	.55817	**.36155**	.56068	**.36365**	.56318	**.36575**	.56567	**.36785**	.56815	**.36996**	*18*
43	.55821	**.36159**	.56073	**.36368**	.56323	**.36579**	.56572	**.36789**	.56819	**.36999**	*17*
+ 11′	9.55826	**.36162**	9.56077	**.36372**	9.56327	**.36582**	9.56576	**.36792**	9.56824	**.37003**	*16*
45	.55830	**.36166**	.56081	**.36376**	.56331	**.36586**	.56580	**.36796**	.56828	**.37006**	*15*
46	.55834	**.36169**	.56085	**.36379**	.56335	**.36589**	.56584	**.36799**	.56832	**.37010**	*14*
47	.55838	**.36173**	.56089	**.36382**	.56339	**.36593**	.56588	**.36803**	.56836	**.37013**	*13*
+ 12′	9.55842	**.36176**	9.56093	**.36386**	9.56343	**.36596**	9.56592	**.36806**	9.56840	**.37017**	*12*
49	.55846	**.36180**	.56098	**.36389**	.56348	**.36600**	.56596	**.36810**	.56844	**.37020**	*11*
50	.55851	**.36183**	.56102	**.36393**	.56352	**.36603**	.56601	**.36813**	.56848	**.37024**	*10*
51	.55855	**.36187**	.56106	**.36396**	.56356	**.36607**	.56605	**.36817**	.56852	**.37027**	*9*
+ 13′	9.55859	**.36190**	9.56110	**.36400**	9.56360	**.36610**	9.56609	**.36820**	9.56856	**.37031**	*8*
53	.55863	**.36194**	.56114	**.36403**	.56364	**.36614**	.56613	**.36824**	.56861	**.37034**	*7*
54	.55867	**.36197**	.56118	**.36407**	.56368	**.36617**	.56617	**.36827**	.56865	**.37038**	*6*
55	.55872	**.36201**	.56123	**.36410**	.56373	**.36621**	.56621	**.36831**	.56869	**.37041**	*5*
+ 14′	9.55876	**.36204**	9.56127	**.36414**	9.56377	**.36624**	9.56625	**.36834**	9.56873	**.37045**	*4*
57	.55880	**.36208**	.56131	**.36417**	.56381	**.36628**	.56630	**.36838**	.56877	**.37049**	*3*
58	.55884	**.36211**	.56135	**.36421**	.56385	**.36631**	.56634	**.36841**	.56881	**.37052**	*2*
59	.55888	**.36215**	.56139	**.36424**	.56389	**.36635**	.56638	**.36845**	.56885	**.37055**	*1*
+ 15′	9.55893	**.36218**	9.56144	**.36428**	9.56393	**.36638**	9.56642	**.36848**	9.56889	**.37059**	*0*
	$19^h\ 4^m$		*$19^h\ 3^m$*		*$19^h\ 2^m$*		*$19^h\ 1^m$*		*$19^h\ 0^m$*		

TABLE 45.

Haversines.

	$5^h\,0^m$ 75° 0′		$5^h\,1^m$ 75° 15′		$5^h\,2^m$ 75° 30′		$5^h\,3^m$ 75° 45′		$5^h\,4^m$ 76° 0′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.56889	.37059	9.57136	.37270	9.57381	.37481	9.57625	.37692	9.57868	.37904	60
1	.56893	.37063	.57140	.37273	.57385	.37485	.57629	.37696	.57872	.37907	59
2	.56898	.37066	.57144	.37277	.57389	.37488	.57633	.37699	.57876	.37911	58
3	.56902	.37070	.57148	.37280	.57393	.37492	.57637	.37703	.57881	.37914	57
+ 1′	9.56906	.37073	9.57152	.37284	9.57397	.37495	9.57642	.37706	9.57885	.37918	56
5	.56910	.37077	.57156	.37287	.57402	.37499	.57646	.37710	.57889	.37922	55
6	.56914	.37080	.57160	.37291	.57406	.37502	.57650	.37713	.57893	.37925	54
7	.56918	.37084	.57165	.37295	.57410	.37506	.57654	.37717	.57897	.37929	53
+ 2′	9.56922	.37087	9.57169	.37298	9.57414	.37509	9.57658	.37721	9.57901	.37932	52
9	.56926	.37091	.57173	.37302	.57418	.37513	.57662	.37724	.57905	.37936	51
10	.56931	.37094	.57177	.37305	.57422	.37516	.57666	.37728	.57909	.37939	50
11	.56935	.37098	.57181	.37309	.57426	.37520	.57670	.37731	.57913	.37943	49
+ 3′	9.56939	.37101	9.57185	.37312	9.57430	.37523	9.57674	.37735	9.57917	.37946	48
13	.56943	.37105	.57189	.37316	.57434	.37527	.57678	.37738	.57921	.37950	47
14	.56947	.37108	.57193	.37319	.57438	.37530	.57682	.37742	.57925	.37953	46
15	.56951	.37112	.57197	.37323	.57442	.37534	.57686	.37745	.57929	.37957	45
+ 4′	9.56955	.37115	9.57201	.37326	9.57446	.37537	9.57690	.37749	9.57933	.37960	44
17	.56959	.37119	.57205	.37330	.57450	.37541	.57694	.37752	.57937	.37964	43
18	.56963	.37122	.57210	.37333	.57454	.37544	.57698	.37756	.57941	.37967	42
19	.56968	.37126	.57214	.37337	.57459	.37548	.57702	.37759	.57945	.37971	41
+ 5′	9.56972	.37129	9.57218	.37340	9.57463	.37551	9.57706	.37763	9.57949	.37974	40
21	.56976	.37133	.57222	.37344	.57467	.37555	.57711	.37766	.57953	.37978	39
22	.56980	.37136	.57226	.37347	.57471	.37558	.57715	.37770	.57957	.37982	38
23	.56984	.37140	.57230	.37351	.57475	.37562	.57719	.37773	.57961	.37985	37
+ 6′	9.56988	.37143	9.57234	.37354	9.57479	.37566	9.57723	.37777	9.57965	.37989	36
25	.56992	.37147	.57238	.37358	.57483	.37569	.57727	.37780	.57969	.37992	35
26	.56996	.37150	.57242	.37361	.57487	.37573	.57731	.37784	.57973	.37996	34
27	.57000	.37154	.57246	.37365	.57491	.37576	.57735	.37788	.57977	.37999	33
+ 7′	9.57005	.37157	9.57250	.37368	9.57495	.37580	9.57739	.37791	9.57981	.38003	32
29	.57009	.37161	.57255	.37372	.57499	.37583	.57743	.37794	.57986	.38006	31
30	.57013	.37164	.57259	.37375	.57503	.37587	.57747	.37798	.57990	.38010	30
31	.57017	.37168	.57263	.37379	.57507	.37590	.57751	.37802	.57994	.38013	29
+ 8′	9.57021	.37171	9.57267	.37382	9.57511	.37594	9.57755	.37805	9.57998	.38017	28
33	.57025	.37175	.57271	.37386	.57516	.37597	.57759	.37809	.58002	.38020	27
34	.57029	.37179	.57275	.37389	.57520	.37601	.57763	.37812	.58006	.38024	26
35	.57033	.37182	.57279	.37393	.57524	.37604	.57767	.37816	.58010	.38027	25
+ 9′	9.57037	.37186	9.57283	.37397	9.57528	.37608	9.57771	.37819	9.58014	.38031	24
37	.57042	.37189	.57287	.37400	.57532	.37611	.57775	.37823	.58018	.38034	23
38	.57046	.37193	.57291	.37404	.57536	.37615	.57779	.37826	.58022	.38038	22
39	.57050	.37196	.57295	.37407	.57540	.37618	.57783	.37830	.58026	.38042	21
+ 10′	9.57054	.37200	9.57299	.37411	9.57544	.37622	9.57787	.37833	9.58030	.38045	20
41	.57058	.37203	.57304	.37414	.57548	.37625	.57792	.37837	.58034	.38049	19
42	.57062	.37207	.57308	.37418	.57552	.37629	.57796	.37840	.58038	.38052	18
43	.57066	.37210	.57312	.37421	.57556	.37632	.57800	.37844	.58042	.38056	17
+ 11′	9.57070	.37214	9.57316	.37425	9.57560	.37636	9.57804	.37847	9.58046	.38059	16
45	.57074	.37217	.57320	.37428	.57564	.37639	.57808	.37851	.58050	.38063	15
46	.57078	.37221	.57324	.37432	.57568	.37643	.57812	.37855	.58054	.38066	14
47	.57083	.37224	.57328	.37435	.57572	.37647	.57816	.37858	.58058	.38070	13
+ 12′	9.57087	.37228	9.57332	.37439	9.57577	.37650	9.57820	.37862	9.58062	.38073	12
49	.57091	.37231	.57336	.37442	.57581	.37654	.57824	.37865	.58066	.38077	11
50	.57095	.37235	.57340	.37446	.57585	.37657	.57828	.37869	.58070	.38080	10
51	.57099	.37238	.57344	.37449	.57589	.37661	.57832	.37872	.58074	.38084	9
+ 13′	9.57103	.37242	9.57348	.37453	9.57593	.37664	9.57836	.37876	9.58078	.38087	8
53	.57107	.37245	.57353	.37456	.57597	.37668	.57840	.37879	.58082	.38091	7
54	.57111	.37249	.57357	.37460	.57601	.37671	.57844	.37883	.58086	.38095	6
55	.57115	.37252	.57361	.37463	.57605	.37675	.57848	.37886	.58090	.38098	5
+ 14′	9.57119	.37256	9.57365	.37467	9.57609	.37678	9.57852	.37890	9.58094	.38102	4
57	.57124	.37259	.57369	.37470	.57613	.37682	.57856	.37893	.58098	.38105	3
58	.57128	.37263	.57373	.37474	.57617	.37685	.57860	.37897	.58102	.38109	2
59	.57132	.37266	.57377	.37477	.57621	.37689	.57864	.37900	.58106	.38112	1
+ 15′	9.57136	.37270	9.57381	.37481	9.57625	.37692	9.57868	.37904	9.58110	.38116	0
	$18^h\,59^m$		$18^h\,58^m$		$18^h\,57^m$		$18^h\,56^m$		$18^h\,55^m$		

TABLE 45.

Haversines.

	5^h 5^m 76° 15′		5^h 6^m 76° 30′		5^h 7^m 76° 45′		5^h 8^m 77° 0′		5^h 9^m 77° 15′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.58110	**.38116**	9.58351	**.38328**	9.58591	**.38540**	9.58830	**.38752**	9.59068	**.38965**	60
1	.58114	**.38119**	.58355	**.38331**	.58595	**.38544**	.58834	**.38756**	.59072	**.38969**	59
2	.58118	**.38123**	.58359	**.38335**	.58599	**.38547**	.58838	**.38760**	.59076	**.38972**	58
3	.58122	**.38126**	.58363	**.38338**	.58603	**.38551**	.58842	**.38763**	.59079	**.38976**	57
+ 1′	9.58126	**.38130**	9.58367	**.38342**	9.58607	**.38554**	9.58846	**.38767**	9.59083	**.38979**	56
5	.58131	**.38133**	.58371	**.38345**	.58611	**.38558**	.58850	**.38770**	.59087	**.38983**	55
6	.58135	**.38137**	.58375	**.38349**	.58615	**.38561**	.58854	**.38774**	.59091	**.38986**	54
7	.58139	**.38140**	.58379	**.38352**	.58619	**.38565**	.58858	**.38777**	.59095	**.38990**	53
+ 2′	9.58143	**.38144**	9.58383	**.38356**	9.58623	**.38568**	9.58862	**.38781**	9.59099	**.38994**	52
9	.58147	**.38148**	.58387	**.38360**	.58627	**.38572**	.58866	**.38784**	.59103	**.38997**	51
10	.58151	**.38151**	.58391	**.38363**	.58631	**.38575**	.58870	**.38788**	.59107	**.39001**	50
11	.58155	**.38155**	.58395	**.38367**	.58635	**.38579**	.58874	**.38791**	.59111	**.39004**	49
+ 3′	9.58159	**.38158**	9.58399	**.38370**	9.58639	**.38582**	9.58878	**.38795**	9.59115	**.39008**	48
13	.58163	**.38162**	.58403	**.38374**	.58643	**.38586**	.58882	**.38799**	.59119	**.39011**	47
14	.58167	**.38165**	.58407	**.38377**	.58647	**.38590**	.58885	**.38802**	.59123	**.39015**	46
15	.58171	**.38169**	.58411	**.38381**	.58651	**.38593**	.58889	**.38806**	.59127	**.39018**	45
+ 4′	9.58175	**.38172**	9.58415	**.38384**	9.58655	**.38597**	9.58893	**.38809**	9.59131	**.39022**	44
17	.58179	**.38176**	.58419	**.38388**	.58659	**.38600**	.58897	**.38813**	.59135	**.39025**	43
18	.58183	**.38179**	.58423	**.38391**	.58663	**.38604**	.58901	**.38816**	.59139	**.39029**	42
19	.58187	**.38183**	.58427	**.38395**	.58667	**.38607**	.58905	**.38820**	.59143	**.39033**	41
+ 5′	9.58191	**.38186**	9.58431	**.38398**	9.58671	**.38611**	9.58909	**.38823**	9.59147	**.39036**	40
21	.58195	**.38190**	.58435	**.38402**	.58675	**.38614**	.58913	**.38827**	.59151	**.39040**	39
22	.58199	**.38193**	.58439	**.38406**	.58679	**.38618**	.58917	**.38830**	.59155	**.39043**	38
23	.58203	**.38197**	.58443	**.38409**	.58683	**.38621**	.58921	**.38834**	.59158	**.39047**	37
+ 6′	9.58207	**.38200**	9.58447	**.38413**	9.58687	**.38625**	9.58925	**.38837**	9.59162	**.39050**	36
25	.58211	**.38204**	.58451	**.38416**	.58691	**.38628**	.58929	**.38841**	.59166	**.39054**	35
26	.58215	**.38208**	.58455	**.38420**	.58695	**.38632**	.58933	**.38845**	.59170	**.39057**	34
27	.58219	**.38211**	.58459	**.38423**	.58699	**.38636**	.58937	**.38848**	.59174	**.39061**	33
+ 7′	9.58223	**.38215**	9.58463	**.38427**	9.58703	**.38639**	9.58941	**.38852**	9.59178	**.39064**	32
29	.58227	**.38218**	.58467	**.38430**	.58707	**.38643**	.58945	**.38855**	.59182	**.39068**	31
30	.58231	**.38222**	.58471	**.38434**	.58711	**.38646**	.58949	**.38859**	.59186	**.39072**	30
31	.58235	**.38225**	.58475	**.38437**	.58715	**.38650**	.58953	**.38862**	.59190	**.39075**	29
+ 8′	9.58239	**.38229**	9.58479	**.38441**	9.58719	**.38653**	9.58957	**.38866**	9.59194	**.39079**	28
33	.58243	**.38232**	.58483	**.38444**	.58723	**.38657**	.58961	**.38869**	.59198	**.39082**	27
34	.58247	**.38236**	.58487	**.38448**	.58727	**.38660**	.58965	**.38873**	.59202	**.39086**	26
35	.58251	**.38239**	.58491	**.38451**	.58731	**.38664**	.58969	**.38876**	.59206	**.39089**	25
+ 9′	9.58255	**.38243**	9.58495	**.38455**	9.58735	**.38667**	9.58973	**.38880**	9.59210	**.39093**	24
37	.58259	**.38246**	.58499	**.38459**	.58739	**.38671**	.58977	**.38884**	.59214	**.39096**	23
38	.58263	**.38250**	.58503	**.38462**	.58742	**.38675**	.58981	**.38887**	.59218	**.39100**	22
39	.58267	**.38254**	.58507	**.38466**	.58746	**.38678**	.58985	**.38891**	.59222	**.39103**	21
+ 10′	9.58271	**.38257**	9.58511	**.38469**	9.58750	**.38682**	9.58989	**.38894**	9.59225	**.39107**	20
41	.58275	**.38261**	.58515	**.38473**	.58754	**.38685**	.58992	**.38898**	.59229	**.39111**	19
42	.58279	**.38264**	.58519	**.38476**	.58758	**.38689**	.58996	**.38901**	.59233	**.39114**	18
43	.58283	**.38268**	.58523	**.38480**	.58762	**.38692**	.59000	**.38905**	.59237	**.39118**	17
+ 11′	9.58287	**.38271**	9.58527	**.38483**	9.58766	**.38696**	9.59004	**.38908**	9.59241	**.39121**	16
45	.58291	**.38275**	.58531	**.38487**	.58770	**.38699**	.59008	**.38912**	.59245	**.39125**	15
46	.58295	**.38278**	.58535	**.38490**	.58774	**.38703**	.59012	**.38915**	.59249	**.39128**	14
47	.58299	**.38282**	.58539	**.38494**	.58778	**.38706**	.59016	**.38919**	.59253	**.39132**	13
+ 12′	9.58303	**.38285**	9.58543	**.38498**	9.58782	**.38710**	9.59020	**.38923**	9.59257	**.39135**	12
49	.58307	**.38289**	.58547	**.38501**	.58786	**.38713**	.59024	**.38926**	.59261	**.39139**	11
50	.58311	**.38292**	.58551	**.38505**	.58790	**.38717**	.59028	**.38930**	.59265	**.39143**	10
51	.58315	**.38296**	.58555	**.38508**	.58794	**.38721**	.59032	**.38933**	.59269	**.39146**	9
+ 13′	9.58319	**.38299**	9.58559	**.38512**	9.58798	**.38724**	9.59036	**.38937**	9.59273	**.39150**	8
53	.58323	**.38303**	.58563	**.38515**	.58802	**.38728**	.59040	**.38940**	.59277	**.39153**	7
54	.58327	**.38307**	.58567	**.38519**	.58806	**.38731**	.59044	**.38944**	.59281	**.39157**	6
55	.58331	**.38310**	.58571	**.38522**	.58810	**.38735**	.59048	**.38947**	.59285	**.39160**	5
+ 14′	9.58335	**.38314**	9.58575	**.38526**	9.58814	**.38738**	9.59052	**.38951**	9.59289	**.39164**	4
57	.58339	**.38317**	.58579	**.38529**	.58818	**.38742**	.59056	**.38954**	.59292	**.39167**	3
58	.58343	**.38321**	.58583	**.38533**	.58822	**.38745**	.59060	**.38958**	.59296	**.39171**	2
59	.58347	**.38324**	.58587	**.38536**	.58826	**.38749**	.59064	**.38962**	.59300	**.39174**	1
+ 15′	9.58351	**.38328**	9.58591	**.38540**	9.58830	**.38752**	9.59068	**.38965**	9.59304	**.39178**	0
	18^h 54^m		18^h 53^m		18^h 52^m		18^h 51^m		18^h 50^m		

TABLE 45.

Haversines.

	$5^h\,10^m$ 77° 30′		$5^h\,11^m$ 77° 45′		$5^h\,12^m$ 78° 0′		$5^h\,13^m$ 78° 15′		$5^h\,14^m$ 78° 30′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.59304	**.39178**	9.59540	**.39391**	9.59774	**.39604**	9.60008	**.39818**	9.60240	**.40032**	60
1	.59308	**.39182**	.59544	**.39395**	.59778	**.39608**	.60012	**.39821**	.60244	**.40035**	59
2	.59312	**.39185**	.59548	**.39398**	.59782	**.39612**	.60016	**.39825**	.60248	**.40039**	58
3	.59316	**.39189**	.59552	**.39402**	.59786	**.39615**	.60020	**.39829**	.60252	**.40042**	57
+ 1′	9.59320	**.39192**	9.59556	**.39405**	9.59790	**.39619**	9.60023	**.39832**	9.60256	**.40046**	56
5	.59324	**.39196**	.59559	**.39409**	.59794	**.39622**	.60027	**.39836**	.60260	**.40049**	55
6	.59328	**.39199**	.59563	**.39412**	.59798	**.39626**	.60031	**.39839**	.60263	**.40053**	54
7	.59332	**.39203**	.59567	**.39416**	.59802	**.39629**	.60035	**.39843**	.60267	**.40057**	53
+ 2′	9.59336	**.39206**	9.59571	**.39420**	9.59806	**.39633**	9.60039	**.39846**	9.60271	**.40060**	52
9	.59340	**.39210**	.59575	**.39423**	.59809	**.39636**	.60043	**.39850**	.60275	**.40064**	51
10	.59344	**.39214**	.59579	**.39427**	.59813	**.39640**	.60047	**.39854**	.60279	**.40067**	50
11	.59348	**.39217**	.59583	**.39430**	.59817	**.39644**	.60051	**.39857**	.60283	**.40071**	49
+ 3′	9.59351	**.39221**	9.59587	**.39434**	9.59821	**.39647**	9.60054	**.39861**	9.60287	**.40074**	48
13	.59355	**.39224**	.59591	**.39437**	.59825	**.39651**	.60058	**.39864**	.60291	**.40078**	47
14	.59359	**.39228**	.59595	**.39441**	.59829	**.39654**	.60062	**.39868**	.60294	**.40081**	46
15	.59363	**.39231**	.59599	**.39444**	.59833	**.39658**	.60066	**.39871**	.60298	**.40085**	45
+ 4′	9.59367	**.39235**	9.59602	**.39448**	9.59837	**.39661**	9.60070	**.39875**	9.60302	**.40089**	44
17	.59371	**.39238**	.59606	**.39451**	.59841	**.39665**	.60074	**.39878**	.60306	**.40092**	43
18	.59375	**.39242**	.59610	**.39455**	.59845	**.39668**	.60078	**.39882**	.60310	**.40096**	42
19	.59379	**.39245**	.59614	**.39459**	.59848	**.39672**	.60082	**.39886**	.60314	**.40099**	41
+ 5′	9.59383	**.39249**	9.59618	**.39462**	9.59852	**.39676**	9.60085	**.39889**	9.60318	**.40103**	40
21	.59387	**.39253**	.59622	**.39466**	.59856	**.39679**	.60089	**.39893**	.60321	**.40106**	39
22	.59391	**.39256**	.59626	**.39469**	.59860	**.39683**	.60093	**.39896**	.60325	**.40110**	38
23	.59395	**.39260**	.59630	**.39473**	.59864	**.39686**	.60097	**.39900**	.60329	**.40114**	37
+ 6′	9.59399	**.39263**	9.59634	**.39476**	9.59868	**.39690**	9.60101	**.39903**	9.60333	**.40117**	36
25	.59403	**.39267**	.59638	**.39480**	.59872	**.39693**	.60105	**.39907**	.60337	**.40121**	35
26	.59406	**.39270**	.59642	**.39484**	.59876	**.39697**	.60109	**.39910**	.60341	**.40124**	34
27	.59410	**.39274**	.59646	**.39487**	.59880	**.39700**	.60113	**.39914**	.60345	**.40128**	33
+ 7′	9.59414	**.39277**	9.59649	**.39491**	9.59883	**.39704**	9.60116	**.39918**	9.60348	**.40131**	32
29	.59418	**.39281**	.59653	**.39494**	.59887	**.39708**	.60120	**.39921**	.60352	**.40135**	31
30	.59422	**.39285**	.59657	**.39498**	.59891	**.39711**	.60124	**.39925**	.60356	**.40139**	30
31	.59426	**.39288**	.59661	**.39501**	.59895	**.39715**	.60128	**.39928**	.60360	**.40142**	29
+ 8′	9.59430	**.39292**	9.59665	**.39505**	9.59899	**.39718**	9.60132	**.39932**	9.60364	**.40146**	28
33	.59434	**.39295**	.59669	**.39508**	.59903	**.39722**	.60136	**.39935**	.60368	**.40149**	27
34	.59438	**.39299**	.59673	**.39512**	.59907	**.39725**	.60140	**.39939**	.60372	**.40153**	26
35	.59442	**.39302**	.59677	**.39516**	.59911	**.39729**	.60144	**.39943**	.60375	**.40156**	25
+ 9′	9.59446	**.39306**	9.59681	**.39519**	9.59915	**.39732**	9.60147	**.39946**	9.60379	**.40160**	24
37	.59450	**.39309**	.59685	**.39523**	.59918	**.39736**	.60151	**.39950**	.60383	**.40163**	23
38	.59454	**.39313**	.59688	**.39526**	.59922	**.39739**	.60155	**.39953**	.60387	**.40167**	22
39	.59458	**.39317**	.59692	**.39530**	.59926	**.39743**	.60159	**.39957**	.60391	**.40171**	21
+ 10′	9.59461	**.39320**	9.59696	**.39533**	9.59930	**.39746**	9.60163	**.39960**	9.60395	**.40174**	20
41	.59465	**.39324**	.59700	**.39537**	.59934	**.39750**	.60167	**.39964**	.60399	**.40178**	19
42	.59469	**.39327**	.59704	**.39540**	.59938	**.39754**	.60171	**.39967**	.60402	**.40181**	18
43	.59473	**.39331**	.59708	**.39544**	.59942	**.39757**	.60175	**.39971**	.60406	**.40185**	17
+ 11′	9.59477	**.39334**	9.59712	**.39548**	9.59946	**.39761**	9.60178	**.39975**	9.60410	**.40188**	16
45	.59481	**.39338**	.59716	**.39551**	.59950	**.39765**	.60182	**.39978**	.60414	**.40192**	15
46	.59485	**.39341**	.59720	**.39555**	.59953	**.39768**	.60186	**.39982**	.60418	**.40196**	14
47	.59489	**.39345**	.59724	**.39558**	.59957	**.39772**	.60190	**.39985**	.60422	**.40199**	13
+ 12′	9.59493	**.39348**	9.59728	**.39562**	9.59961	**.39775**	9.60194	**.39989**	9.60426	**.40203**	12
49	.59497	**.39352**	.59731	**.39565**	.59965	**.39779**	.60198	**.39992**	.60429	**.40206**	11
50	.59501	**.39356**	.59735	**.39569**	.59969	**.39782**	.60202	**.39996**	.60433	**.40210**	10
51	.59505	**.39359**	.59739	**.39572**	.59973	**.39786**	.60206	**.40000**	.60437	**.40213**	9
+ 13′	9.59508	**.39363**	9.59743	**.39576**	9.59977	**.39789**	9.60209	**.40003**	9.60441	**.40217**	8
53	.59512	**.39366**	.59747	**.39580**	.59981	**.39793**	.60213	**.40007**	.60445	**.40220**	7
54	.59516	**.39370**	.59751	**.39583**	.59985	**.39796**	.60217	**.40010**	.60449	**.40224**	6
55	.59520	**.39373**	.59755	**.39587**	.59988	**.39800**	.60221	**.40014**	.60452	**.40228**	5
+ 14′	9.59524	**.39377**	9.59759	**.39590**	9.59992	**.39803**	9.60225	**.40017**	9.60456	**.40231**	4
57	.59528	**.39380**	.59763	**.39594**	.59996	**.39807**	.60229	**.40021**	.60460	**.40235**	3
58	.59532	**.39384**	.59767	**.39597**	.60000	**.39811**	.60233	**.40024**	.60464	**.40238**	2
59	.59536	**.39388**	.59770	**.39601**	.60004	**.39814**	.60236	**.40028**	.60468	**.40242**	1
+ 15′	9.59540	**.39391**	9.59774	**.39604**	9.60008	**.39818**	9.60240	**.40032**	9.60472	**.40245**	0
	$18^h\,49^m$		$18^h\,48^m$		$18^h\,47^m$		$18^h\,46^m$		$18^h\,45^m$		

TABLE 45.

Haversines.

s	5h 15m 78° 45′		5h 16m 79° 0′		5h 17m 79° 15′		5h 18m 79° 30′		5h 19m 79° 45′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.60472	**.40245**	9.60702	**.40460**	9.60931	**.40674**	9.61160	**.40888**	9.61387	**.41103**	60
1	.60476	**.40249**	.60706	**.40463**	.60935	**.40677**	.61164	**.40892**	.61391	**.41106**	59
2	.60479	**.40253**	.60710	**.40467**	.60939	**.40681**	.61167	**.40895**	.61395	**.41110**	58
3	.60483	**.40256**	.60714	**.40470**	.60943	**.40685**	.61171	**.40899**	.61399	**.41114**	57
+ 1′	9.60487	**.40260**	9.60717	**.40474**	9.60947	**.40688**	9.61175	**.40903**	9.61402	**.41117**	56
5	.60491	**.40263**	.60721	**.40477**	.60951	**.40692**	.61179	**.40906**	.61406	**.41121**	55
6	.60495	**.40267**	.60725	**.40481**	.60954	**.40695**	.61183	**.40910**	.61410	**.41124**	54
7	.60499	**.40270**	.60729	**.40485**	.60958	**.40699**	.61186	**.40913**	.61414	**.41128**	53
+ 2′	9.60502	**.40274**	9.60733	**.40488**	9.60962	**.40702**	9.61190	**.40917**	9.61417	**.41131**	52
9	.60506	**.40277**	.60737	**.40492**	.60966	**.40706**	.61194	**.40920**	.61421	**.41135**	51
10	.60510	**.40281**	.60740	**.40495**	.60970	**.40710**	.61198	**.40924**	.61425	**.41139**	50
11	.60514	**.40285**	.60744	**.40499**	.60973	**.40713**	.61202	**.40928**	.61429	**.41142**	49
+ 3′	9.60518	**.40288**	9.60748	**.40502**	9.60977	**.40717**	9.61205	**.40931**	9.61433	**.41146**	48
13	.60522	**.40292**	.60752	**.40506**	.60981	**.40720**	.61209	**.40935**	.61436	**.41149**	47
14	.60526	**.40295**	.60756	**.40510**	.60985	**.40724**	.61213	**.40938**	.61440	**.41153**	46
15	.60529	**.40299**	.60760	**.40513**	.60989	**.40727**	.61217	**.40942**	.61444	**.41156**	45
+ 4′	9.60533	**.40303**	9.60763	**.40517**	9.60992	**.40731**	9.61221	**.40945**	9.61448	**.41160**	44
17	.60537	**.40306**	.60767	**.40520**	.60996	**.40735**	.61224	**.40949**	.61451	**.41164**	43
18	.60541	**.40310**	.60771	**.40524**	.61000	**.40738**	.61228	**.40953**	.61455	**.41167**	42
19	.60545	**.40313**	.60775	**.40527**	.61004	**.40742**	.61232	**.40956**	.61459	**.41171**	41
+ 5′	9.60549	**.40317**	9.60779	**.40531**	9.61008	**.40745**	9.61236	**.40960**	9.61463	**.41174**	40
21	.60552	**.40320**	.60783	**.40535**	.61012	**.40749**	.61240	**.40963**	.61467	**.41178**	39
22	.60556	**.40324**	.60786	**.40538**	.61015	**'40752**	.61243	**.40967**	.61470	**.41182**	38
23	.60560	**.40328**	.60790	**.40542**	.61019	**.40756**	.61247	**.40970**	.61474	**.41185**	37
+ 6′	9.60564	**.40331**	9.60794	**.40545**	9.61023	**.40760**	9.61251	**.40974**	9.61478	**.41189**	36
25	.60568	**.40335**	.60798	**.40549**	.61027	**.40763**	.61255	**.40978**	.61482	**.41192**	35
26	.60572	**.40338**	.60802	**.40552**	.61031	**.40767**	.61258	**.40981**	.61485	**.41196**	34
27	.60576	**.40342**	.60805	**.40556**	.61034	**.40770**	.61262	**.40985**	.61489	**.41199**	33
+ 7′	9.60579	**.40345**	9.60809	**.40560**	9.61038	**.40774**	9.61266	**.40988**	9.61493	**.41203**	32
29	.60583	**.40349**	.60813	**.40563**	.61042	**.40777**	.61270	**.40992**	.61497	**.41207**	31
30	.60587	**.40352**	.60817	**.40567**	.61046	**.40781**	.61274	**.40996**	.61500	**.41210**	30
31	.60591	**.40356**	.60821	**.40570**	.61050	**.40785**	.61277	**.40999**	.61504	**.41214**	29
+ 8′	9.60595	**.40360**	9.60825	**.40574**	9.61053	**.40788**	9.61281	**.41003**	9.61508	**.41217**	28
33	.60599	**.40363**	.60828	**.40577**	.61057	**.40792**	.61285	**.41006**	.61512	**.41221**	27
34	.60602	**.40367**	.60832	**.40581**	.61061	**.40795**	.61289	**.41010**	.61516	**.41225**	26
35	.60606	**.40370**	.60836	**.40585**	.61065	**.40799**	.61293	**.41013**	.61519	**.41223**	25
+ 9′	9.60610	**.40374**	9.60840	**.40588**	9.61069	**.40802**	9.61296	**.41017**	9.61523	**.41232**	24
37	.60614	**.40377**	.60844	**.40592**	.61072	**.40806**	.61300	**.41021**	.61527	**.41235**	23
38	.60618	**.40381**	.60847	**.40595**	.61076	**.40810**	.61304	**.41024**	.61531	**.41239**	22
39	.60622	**.40385**	.60851	**.40599**	.61080	**.40813**	.61308	**.41028**	.61534	**.41242**	21
+ 10′	9.60625	**.40388**	9.60855	**.40602**	9.61084	**.40317**	9.61312	**.41031**	9.61538	**.41246**	20
41	.60629	**.40392**	.60859	**.40606**	.61088	**.40820**	.61315	**.41035**	.61542	**.41250**	19
42	.60633	**.40395**	.60863	**.40610**	.61091	**.40824**	.61319	**.41039**	.61546	**.41253**	18
43	.60637	**.40399**	.60867	**.40613**	.61095	**.40827**	.61323	**.41042**	.61549	**.41257**	17
+ 11′	9.60641	**.40402**	9.60870	**.40617**	9.61099	**.40831**	9.61327	**.41046**	9.61553	**.41260**	16
45	.60645	**.40406**	.60874	**.40620**	.61103	**.40835**	.61330	**.41049**	.61557	**.41264**	15
46	.60648	**.40410**	.60878	**.40624**	.61107	**.40838**	.61334	**.41053**	.61561	**.41267**	14
47	.60652	**.40413**	.60882	**.40627**	.61110	**.40842**	.61338	**.41056**	.61565	**.41271**	13
+ 12′	9.60656	**.40417**	9.60886	**.40631**	9.61114	**.40845**	9.61342	**.41060**	9.61568	**.41275**	12
49	.60660	**.40420**	.60890	**.40635**	.61118	**.40849**	.61346	**.41063**	.61572	**.41278**	11
50	.60664	**.40424**	.60893	**.40638**	.61122	**.40852**	.61349	**.41067**	.61576	**.41282**	10
51	.60668	**.40427**	.60897	**.40642**	.61126	**.40856**	.61353	**.41071**	.61580	**.41285**	9
+ 13′	9.60671	**.40431**	9.60901	**.40615**	9.61129	**.40860**	9.61357	**.41074**	9.61583	**.41289**	8
53	.60675	**.40434**	.60905	**.40649**	.61133	**.40863**	.61361	**.41078**	.61587	**.41293**	7
54	.60679	**.40438**	.60909	**.40652**	.61137	**.40867**	.61364	**.41082**	.61591	**.41296**	6
55	.60683	**.40442**	.60912	**.40656**	.61141	**.40870**	.61368	**.41085**	.61595	**.41300**	5
+ 14′	9.60687	**.40445**	9.60916	**.40660**	9.61145	**.40874**	9.61372	**.41089**	9.61598	**.41303**	4
57	.60691	**.40449**	.60920	**.40663**	.61148	**.40878**	.61376	**.41092**	.61602	**.41307**	3
58	.60694	**.40452**	.60924	**.40667**	.61152	**.40881**	.61380	**.41096**	.61606	**.41310**	2
59	.60698	**.40456**	.60928	**.40670**	.61156	**.40885**	.61383	**.41099**	.61610	**.41314**	1
+ 15′	9.60702	**.40460**	9.60931	**.40674**	9.61160	**.40888**	9.61387	**.41103**	9.61614	**.41318**	0
	18h 44m		18h 43m		18h 42m		18h 41m		18h 40m		

TABLE 45.

Haversines.

	$5^h\,20^m$ 80° 0′		$5^h\,21^m$ 80° 15′		$5^h\,22^m$ 80° 30′		$5^h\,23^m$ 80° 45′		$5^h\,24^m$ 81° 0′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.61614	.41318	9.61839	.41533	9.62063	.41748	9.62287	.41963	9.62509	.42178	60
1	.61617	.41321	.61843	.41536	.62067	.41751	.62290	.41966	.62513	.42182	59
2	.61621	.41325	.61846	.41540	.62071	.41755	.62294	.41970	.62516	.42185	58
3	.61625	.41328	.61850	.41543	.62074	.41758	.62298	.41974	.62520	.42189	57
+ 1′	9.61629	.41332	9.61854	.41547	9.62078	.41762	9.62301	.41977	9.62524	.42193	56
5	.61632	.41335	.61858	.41550	.62082	.41766	.62305	.41981	.62527	.42196	55
6	.61636	.41339	.61861	.41554	.62086	.41769	.62309	.41984	.62531	.42200	54
7	.61640	.41343	.61865	.41558	.62089	.41773	.62313	.41988	.62535	.42203	53
+ 2′	9.61644	.41346	9.61869	.41561	9.62093	.41776	9.62316	.41992	9.62538	.42207	52
9	.61647	.41350	.61873	.41565	.62097	.41780	.62320	.41995	.62542	.42211	51
10	.61651	.41353	.61876	.41568	.62100	.41783	.62324	.41999	.62546	.42214	50
11	.61655	.41357	.61880	.41572	.62104	.41787	.62327	.42002	.62550	.42218	49
+ 3′	9.61659	.41361	9.61884	.41576	9.62108	.41791	9.62331	.42006	9.62553	.42221	48
13	.61662	.41364	.61888	.41579	.62112	.41794	.62335	.42010	.62557	.42225	47
14	.61666	.41368	.61891	.41583	.62115	.41798	.62338	.42013	.62561	.42229	46
15	.61670	.41371	.61895	.41586	.62119	.41801	.62342	.42017	.62564	.42232	45
+ 4′	9.61674	.41375	9.61899	.41590	9.62123	.41805	9.62346	.42020	9.62568	.42236	44
17	.61677	.41378	.61903	.41593	.62127	.41809	.62350	.42024	.62572	.42239	43
18	.61681	.41382	.61906	.41597	.62130	.41812	.62353	.42027	.62575	.42243	42
19	.61685	.41386	.61910	.41601	.62134	.41816	.62357	.42031	.62579	.42247	41
+ 5′	9.61689	.41389	9.61914	.41604	9.62138	.41819	9.62361	.42035	9.62583	.42250	40
21	.61692	.41393	.61917	.41608	.62141	.41823	.62364	.42038	.62586	.42254	39
22	.61696	.41396	.61921	.41611	.62145	.41827	.62368	.42042	.62590	.42257	38
23	.61700	.41400	.61925	.41615	.62149	.41830	.62372	.42045	.62594	.42261	37
+ 6′	9.61704	.41404	9.61929	.41619	9.62153	.41834	9.62376	.42049	9.62598	.42264	36
25	.61708	.41407	.61932	.41622	.62156	.41837	.62379	.42053	.62601	.42268	35
26	.61711	.41411	.61936	.41626	.62160	.41841	.62383	.42056	.62605	.42272	34
27	.61715	.41414	.61940	.41629	.62164	.41844	.62387	.42060	.62609	.42275	33
+ 7′	9.61719	.41418	9.61944	.41633	9.62168	.41848	9.62390	.42063	9.62612	.42279	32
29	.61723	.41421	.61947	.41636	.62171	.41852	.62394	.42067	.62616	.42282	31
30	.61726	.41425	.61951	.41640	.62175	.41855	.62398	.42071	.62620	.42286	30
31	.61730	.41429	.61955	.41644	.62179	.41859	.62402	.42074	.62623	.42290	29
+ 8′	9.61734	.41432	9.61959	.41647	9.62182	.41862	9.62405	.42078	9.62627	.42293	28
33	.61738	.41436	.61962	.41651	.62186	.41866	.62409	.42081	.62631	.42297	27
34	.61741	.41439	.61966	.41654	.62190	.41870	.62413	.42085	.62634	.42300	26
35	.61745	.41443	.61970	.41658	.62194	.41873	.62416	.42089	.62638	.42304	25
+ 9′	9.61749	.41447	9.61974	.41662	9.62197	.41877	9.62420	.42092	9.62642	.42308	24
37	.61753	.41450	.61977	.41665	.62201	.41880	.62424	.42096	.62646	.42311	23
38	.61756	.41454	.61981	.41669	.62205	.41884	.62427	.42099	.62649	.42315	22
39	.61760	.41457	.61985	.41672	.62208	.41888	.62431	.42103	.62653	.42318	21
+ 10′	9.61764	.41461	9.61989	.41676	9.62212	.41891	9.62435	.42106	9.62657	.42322	20
41	.61768	.41464	.61992	.41679	.62216	.41895	.62439	.42110	.62660	.42326	19
42	.61771	.41468	.61996	.41683	.62220	.41898	.62442	.42114	.62664	.42329	18
43	.61775	.41472	.62000	.41687	.62223	.41902	.62446	.42117	.62668	.42333	17
+ 11′	9.61779	.41475	9.62003	.41690	9.62227	.41905	9.62450	.42121	9.62671	.42336	16
45	.61783	.41479	.62007	.41694	.62231	.41909	.62453	.42124	.62675	.42340	15
46	.61786	.41482	.62011	.41697	.62234	.41913	.62457	.42128	.62679	.42344	14
47	.61790	.41486	.62015	.41701	.62238	.41916	.62461	.42132	.62682	.42347	13
+ 12′	9.61794	.41490	9.62018	.41705	9.62242	.41920	9.62464	.42135	9.62686	.42351	12
49	.61798	.41493	.62022	.41708	.62246	.41923	.62468	.42139	.62690	.42354	11
50	.61801	.41497	.62026	.41712	.62249	.41927	.62472	.42142	.62693	.42358	10
51	.61805	.41500	.62030	.41715	.62253	.41931	.62476	.42146	.62697	.42361	9
+ 13′	9.61809	.41504	9.62033	.41719	9.62257	.41934	9.62479	.42150	9.62701	.42365	8
53	.61813	.41507	.62037	.41722	.62261	.41938	.62483	.42153	.62704	.42369	7
54	.61816	.41511	.62041	.41726	.62264	.41941	.62487	.42157	.62708	.42372	6
55	.61820	.41515	.62045	.41730	.62268	.41945	.62490	.42160	.62712	.42376	5
+ 14′	9.61824	.41518	9.62048	.41733	9.62272	.41949	9.62491	.42164	9.62716	.42379	4
57	.61828	.41522	.62052	.41737	.62275	.41952	.62498	.42168	.62719	.42383	3
58	.61831	.41525	.62056	.41740	.62279	.41956	.62501	.42171	.62723	.42387	2
59	.61835	.41529	.62059	.41744	.62283	.41959	.62505	.42175	.62727	.42390	1
+ 15′	9.61839	.41533	9.62063	.41748	9.62287	.41963	9.62509	.42178	9.62730	.42394	0
	$18^h\,39^m$		$18^h\,38^m$		$18^h\,37^m$		$18^h\,36^m$		$18^h\,35^m$		

TABLE 45.

Haversines.

s	5^h 25^m 81° 15′		5^h 26^m 81° 30′		5^h 27^m 81° 45′		5^h 28^m 82° 0′		5^h 29^m 82° 15′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav	Nat. Hav.	
0	9.62730	.42394	9.62951	.42610	9.63170	.42825	9.63389	.43041	9.63606	.43257	60
1	.62734	.42397	.62954	.42613	.63174	.42829	.63392	.43045	.63610	.43261	59
2	.62738	.42401	.62958	.42617	.63177	.42833	.63396	.43049	.63613	.43265	58
3	.62741	.42405	.62962	.42620	.63181	.42836	.63399	.43052	.63617	.43268	57
+ 1′	9.62745	.42408	9.62965	.42624	9.63185	.42840	9.63403	.43056	9.63621	.43272	56
5	.62749	.42412	.62969	.42628	.63188	.42843	.63407	.43059	.63624	.43275	55
6	.62752	.42415	.62973	.42631	.63192	.42847	.63410	.43063	.63628	.43279	54
7	.62756	.42419	.62976	.42635	.63196	.42851	.63414	.43067	.63631	.43283	53
+ 2′	9.62760	.42423	9.62980	.42638	9.63199	.42854	9.63418	.43070	9.63635	.43286	52
9	.62763	.42426	.62984	.42642	.63203	.42858	.63421	.43074	.63639	.43290	51
10	.62767	.42430	.62987	.42645	.63207	.42861	.63425	.43077	.63642	.43293	50
11	.62771	.42433	.62991	.42649	.63210	.42865	.63429	.43081	.63646	.43297	49
+ 3′	9.62774	.42437	9.62995	.42653	9.63214	.42869	9.63432	.43085	9.63649	.43301	48
13	.62778	.42441	.62998	.42656	.63218	.42872	.63436	.43088	.63653	.43304	47
14	.62782	.42444	.63002	.42660	.63221	.42876	.63439	.43092	.63657	.43308	46
15	.62785	.42448	.63006	.42663	.63225	.42879	.63443	.43095	.63660	.43312	45
+ 4′	9.62789	.42451	9.63009	.42667	9.63228	.42883	9.63447	.43099	9.63664	.43315	44
17	.62793	.42455	.63013	.42671	.63232	.42887	.63450	.43103	.63668	.43319	43
18	.62796	.42459	.63017	.42674	.63236	.42890	.63454	.43106	.63671	.43322	42
19	.62800	.42462	.63020	.42678	.63239	.42894	.63458	.43110	.63675	.43326	41
+ 5′	9.62804	.42466	9.63024	.42681	9.63243	.42897	9.63461	.43113	9.63678	.43330	40
21	.62808	.42469	.63028	.42685	.63247	.42901	.63465	.43117	.63682	.43333	39
22	.62811	.42473	.63031	.42689	.63250	.42905	.63468	.43121	.63686	.43337	38
23	.62815	.42477	.63035	.42692	.63254	.42908	.63472	.43124	.63689	.43340	37
+ 6′	9.62819	.42480	9.63039	.42696	9.63258	.42912	9.63476	.43128	9.63693	.43344	36
25	.62822	.42484	.63042	.42699	.63261	.42915	.63479	.43131	.63696	.43348	35
26	.62826	.42487	.63046	.42703	.63265	.42919	.63483	.43135	.63700	.43351	34
27	.62830	.42491	.63050	.42707	.63269	.42923	.63487	.43139	.63704	.43355	33
+ 7′	9.62833	.42494	9.63063	.42710	9.63272	.42926	9.63490	.43142	9.63707	.43358	32
29	.62837	.42498	.63057	.42714	.63276	.42930	.63494	.43146	.63711	.43362	31
30	.62841	.42502	.63061	.42717	.63279	.42933	.63497	.43149	.63714	.43366	30
31	.62844	.42505	.63064	.42721	.63283	.42937	.63501	.43153	.63718	.43369	29
+ 8′	9.62848	.42509	9.63068	.42725	9.63287	.42941	9.63505	.43157	9.63722	.43373	28
33	.62852	.42512	.63071	.42728	.63290	.42944	.63508	.43160	.63725	.43376	27
34	.62855	.42516	.63075	.42732	.63294	.42948	.63512	.43164	.63729	.43380	26
35	.62859	.42520	.63079	.42735	.63298	.42951	.63516	.43167	.63733	.43384	25
+ 9′	9.62863	.42523	9.63082	.42739	9.63301	.42955	9.63519	.43171	9.63736	.43387	24
37	.62866	.42527	.63086	.42743	.63305	.42959	.63523	.43175	.63740	.43391	23
38	.62870	.42530	.63090	.42746	.63309	.42962	.63526	.43178	.63743	.43394	22
39	.62874	.42534	.63093	.42750	.63312	.42966	.63530	.43182	.63747	.43398	21
+ 10′	9.62877	.42538	9.63097	.42753	9.63316	.42969	9.63534	.43185	9.63751	.43402	20
41	.62881	.42541	.63101	.42757	.63320	.42973	.63537	.43189	.63754	.43405	19
42	.62885	.42545	.63104	.42761	.63323	.42977	.63541	.43193	.63758	.43409	18
43	.62888	.42548	.63108	.42764	.63327	.42980	.63545	.43196	.63761	.43412	17
+ 11′	9.62892	.42552	9.63112	.42768	9.63330	.42984	9.63548	.43200	9.63765	.43416	16
45	.62896	.42556	.63115	.42771	.63334	.42987	.63552	.43203	.63769	.43420	15
46	.62899	.42559	.63119	.42775	.63338	.42991	.63555	.43207	.63772	.43423	14
47	.62903	.42563	.63123	.42779	.63341	.42995	.63559	.43211	.63776	.43427	13
+ 12′	9.62907	.42566	9.63126	.42782	9.63345	.42998	9.63563	.43214	9.63779	.43430	12
49	.62910	.42570	.63130	.42786	.63349	.43002	.63566	.43218	.63783	.43434	11
50	.62914	.42574	.63134	.42789	.63352	.43005	.63570	.43221	.63787	.43438	10
51	.62918	.42577	.63137	.42793	.63356	.43009	.63574	.43225	.63790	.43441	9
+ 13′	9.62921	.42581	9.63141	.42797	9.63360	.43013	9.63577	.43229	9.63794	.43445	8
53	.62925	.42584	.63145	.42800	.63363	.43016	.63581	.43232	.63797	.43448	7
54	.62929	.42588	.63148	.42804	.63367	.43020	.63584	.43236	.63801	.43452	6
55	.62932	.42592	.63152	.42807	.63370	.43023	.63588	.43239	.63805	.43456	5
+ 14′	9.62936	.42595	9.63156	.42811	9.63374	.43027	9.63592	.43243	9.63808	.43459	4
57	.62940	.42599	.63159	.42815	.63378	.43031	.63595	.43247	.63812	.43463	3
58	.62943	.42602	.63163	.42818	.63381	.43034	.63599	.43250	.63815	.43466	2
59	.62947	.42606	.63166	.42822	.63385	.43038	.63602	.43254	.63819	.43470	1
+ 15′	9.62951	.42610	9.63170	.42825	9.63389	.43041	9.63606	.43257	9.63823	.43474	0
	18^h 34^m		18^h 33^m		18^h 32^m		18^h 31^m		18^h 30^m		

TABLE 45.

Haversines.

	$5^h\ 30^m$ 82° 30′		$5^h\ 31^m$ 82° 45′		$5^h\ 32^m$ 83° 0′		$5^h\ 33^m$ 83° 15′		$5^h\ 34^m$ 83° 30′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.63823	.43474	9.64038	.43690	9.64253	.43907	9.64467	.44123	9.64679	.44340	60
1	.63826	.43477	.64042	.43694	.64256	.43910	.64470	.44127	.64683	.44343	59
2	.63830	.43481	.64046	.43697	.64260	.43914	.64474	.44130	.64686	.44347	58
3	.63833	.43485	.64049	.43701	.64264	.43917	.64477	.44134	.64690	.44351	57
+ 1′	9.63837	.43488	9.64053	.43704	9.64267	.43921	9.64481	.44138	9.64694	.44354	56
5	.63841	.43492	.64056	.43708	.64271	.43925	.64484	.44141	.64697	.44358	55
6	.63844	.43495	.64060	.43712	.64274	.43928	.64488	.44145	.64701	.44362	54
7	.63848	.43499	.64063	.43715	.64278	.43932	.64492	.44148	.64704	.44365	53
+ 2′	9.63851	.43503	9.64067	.43719	9.64281	.43935	9.64495	.44152	9.64708	.44369	52
9	.63855	.43506	.64071	.43723	.64285	.43939	.64499	.44156	.64711	.44372	51
10	.63859	.43510	.64074	.43726	.64289	.43943	.64502	.44159	.64715	.44376	50
11	.63862	.43513	.64078	.43730	.64292	.43946	.64506	.44163	.64718	.44380	49
+ 3′	9.63866	.43517	9.64081	.43733	9.64296	.43950	9.64509	.44166	9.64722	.44383	48
13	.63869	.43521	.64085	.43737	.64299	.43953	.64513	.44170	.64725	.44387	47
14	.63873	.43524	.64088	.43741	.64303	.43957	.64516	.44174	.64729	.44390	46
15	.63877	.43528	.64092	.43744	.64306	.43961	.64520	.44177	.64732	.44394	45
+ 4′	9.63880	.43531	9.64096	.43748	9.64310	.43964	9.64523	.44181	9.64736	.44398	44
17	.63884	.43535	.64099	.43751	.64314	.43968	.64527	.44185	.64740	.44401	43
18	.63887	.43539	.64102	.43755	.64317	.43972	.64531	.44188	.64743	.44405	42
19	.63891	.43542	.64106	.43759	.64321	.43975	.64534	.44192	.64747	.44408	41
+ 5′	9.63895	.43546	9.64110	.43762	9.64324	.43979	9.64538	.44195	9.64750	.44412	40
21	.63898	.43549	.64113	.43766	.64328	.43982	.64541	.44199	.64754	.44416	39
22	.63902	.43553	.64117	.43769	.64331	.43986	.64545	.44203	.64757	.44419	38
23	.63905	.43557	.64121	.43773	.64335	.43990	.64548	.44206	.64761	.44423	37
+ 8′	9.63909	.43560	9.64124	.43777	9.64339	.43993	9.64552	.44210	9.64764	.44427	36
25	.63913	.43564	.64128	.43780	.64342	.43997	.64555	.44213	.64768	.44430	35
26	.63916	.43567	.64131	.43784	.64346	.44000	.64559	.44217	.64771	.44434	34
27	.63920	.43571	.64135	.43787	.64349	.44004	.64563	.44221	.64775	.44437	33
+ 7′	9.63923	.43575	9.64139	.43791	9.64353	.44008	9.64566	.44224	9.64778	.44441	32
29	.63927	.43578	.64142	.43795	.64356	.44011	.64570	.44228	.64782	.44445	31
30	.63931	.43582	.64146	.43798	.64360	.44015	.64573	.44231	.64785	.44448	30
31	.63934	.43585	.64149	.43802	.64363	.44018	.64577	.44235	.64789	.44452	29
+ 8′	9.63938	.43589	9.64153	.43805	9.64367	.44022	9.64580	.44239	9.64793	.44455	28
33	.63941	.43593	.64156	.43809	.64371	.44026	.64584	.44242	.64796	.44459	27
34	.63945	.43596	.64160	.43813	.64374	.44029	.64587	.44246	.64800	.44463	26
35	.63949	.43600	.64164	.43816	.64378	.44033	.64591	.44250	.64803	.44466	25
+ 9′	9.63952	.43603	9.64167	.43820	9.64381	.44036	9.64594	.44253	9.64807	.44470	24
37	.63956	.43607	.64171	.43824	.64385	.44040	.64598	.44257	.64810	.44474	23
38	.63959	.43611	.64174	.43827	.64388	.44044	.64602	.44260	.64814	.44477	22
39	.63963	.43614	.64178	.43831	.64392	.44047	.64605	.44264	.64817	.44481	21
+ 10′	9.63966	.43618	9.64181	.43834	9.64396	.44051	9.64609	.44268	9.64821	.44484	20
41	.63970	.43622	.64185	.43838	.64399	.44055	.64612	.44271	.64824	.44488	19
42	.63974	.43625	.64189	.43842	.64403	.44058	.64616	.44275	.64828	.44492	18
43	.63977	.43629	.64192	.43845	.64406	.44062	.64619	.44278	.64831	.44495	17
+ 11′	9.63981	.43632	9.64196	.43849	9.64410	.44065	9.64623	.44282	9.64835	.44499	16
45	.63984	.43636	.64199	.43852	.64413	.44069	.64626	.44286	.64838	.44502	15
46	.63988	.43640	.64203	.43856	.64417	.44073	.64630	.44289	.64842	.44506	14
47	.63992	.43643	.64206	.43860	.64420	.44076	.64633	.44293	.64845	.44510	13
+ 12′	9.63995	.43647	9.64210	.43863	9.64424	.44080	9.64637	.44296	9.64849	.44513	12
49	.63999	.43650	.64214	.43867	.64428	.44083	.64640	.44300	.64852	.44517	11
50	.64002	.43654	.64217	.43870	.64431	.44087	.64644	.44304	.64856	.44521	10
51	.64006	.43658	.64221	.43874	.64435	.44091	.64648	.44307	.64860	.44524	9
+ 13′	9.64010	.43661	9.64224	.43878	9.64438	.44094	9.64651	.44311	9.64863	.44528	8
53	.64013	.43665	.64228	.43881	.64442	.44098	.64655	.44315	.64867	.44531	7
54	.64017	.43668	.64231	.43885	.64445	.44101	.64658	.44318	.64870	.44535	6
55	.64020	.43672	.64235	.43888	.64449	.44105	.64662	.44322	.64874	.44539	5
+ 14′	9.64024	.43676	9.64239	.43892	9.64452	.44109	9.64665	.44325	9.64877	.44542	4
57	.64028	.43679	.64242	.43896	.64456	.44112	.64669	.44329	.64881	.44546	3
58	.64031	.43683	.64246	.43899	.64460	.44116	.64672	.44333	.64884	.44549	2
59	.64035	.43686	.64249	.43903	.64463	.44120	.64676	.44336	.64888	.44553	1
+ 15′	9.64038	.43690	9.64253	.43907	9.64467	.44123	9.64679	.44340	9.64891	.44557	0
	$18^h\ 29^m$		$18^h\ 28^m$		$18^h\ 27^m$		$18^h\ 26^m$		$18^h\ 25^m$		

TABLE 45.

Haversines.

s	$5^h\ 35^m$ 83° 45′		$5^h\ 36^m$ 84° 0′		$5^h\ 37^m$ 84° 15′		$5^h\ 38^m$ 84° 30′		$5^h\ 39^m$ 84° 45′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.64891	**.44557**	9.65102	**.44774**	9.65312	**.44991**	9.65521	**.45208**	9.65729	**.45425**	60
1	.64895	**.44560**	.65106	**.44777**	.65316	**.44994**	.65525	**.45211**	.65733	**.45429**	59
2	.64898	**.44564**	.65109	**.44781**	.65319	**.44998**	.65528	**.45215**	.65736	**.45432**	58
3	.64902	**.44568**	.65113	**.44784**	.65323	**.45001**	.65532	**.45219**	.65740	**.45436**	57
+ 1′	9.64905	**.44571**	9.65116	**.44788**	9.65326	**.45005**	9.65535	**.45222**	9.65743	**.45439**	56
5	.64909	**.44575**	.65120	**.44792**	.65330	**.45009**	.65539	**.45226**	.65747	**.45443**	55
6	.64912	**.44578**	.65123	**.44795**	.65333	**.45012**	.65542	**.45229**	.65750	**.45447**	54
7	.64916	**.44582**	.65127	**.44799**	.65337	**.45016**	.65546	**.45233**	.65754	**.45450**	53
+ 2′	9.64919	**.44586**	9.65130	**.44803**	9.65340	**.45020**	9.65549	**.45237**	9.65757	**.45454**	52
9	.64923	**.44589**	.65134	**.44806**	.65344	**.45023**	.65553	**.45240**	.65761	**.45458**	51
10	.64926	**.44593**	.65137	**.44810**	.65347	**.45027**	.65556	**.45244**	.65764	**.45461**	50
11	.64930	**.44596**	.65141	**.44813**	.65351	**.45030**	.65559	**.45248**	.65767	**.45465**	49
+ 3′	9.64934	**.44600**	9.65144	**.44817**	9.65354	**.45034**	9.65563	**.45251**	9.65771	**.45468**	48
13	.64937	**.44604**	.65148	**.44821**	.65358	**.45038**	.65566	**.45235**	.65774	**.45472**	47
14	.64941	**.44607**	.65151	**.44824**	.65361	**.45041**	.65570	**.45258**	.65778	**.45476**	46
15	.64944	**.44611**	.65155	**.44828**	.65365	**.45045**	.65573	**.45262**	.65781	**.45479**	45
+ 4′	9.64948	**.44614**	9.65158	**.44831**	9.65368	**.45048**	9.65577	**.45266**	9.65785	**.45483**	44
17	.64951	**.44618**	.65162	**.44835**	.65372	**.45052**	.65580	**.45269**	.65788	**.45486**	43
18	.64955	**.44622**	.65165	**.44839**	.65375	**.45056**	.65584	**.45273**	.65792	**.45490**	42
19	.64958	**.44625**	.65169	**.44842**	.65378	**.45059**	.65587	**.45276**	.65795	**.45494**	41
+ 5′	9.64962	**.44629**	9.65172	**.44846**	9.65382	**.45063**	9.65591	**.45280**	9.65799	**.45497**	40
21	.64965	**.44633**	.65176	**.44850**	.65385	**.45067**	.65594	**.45284**	.65802	**.45501**	39
22	.64969	**.44636**	.65179	**.44853**	.65389	**.45070**	.65598	**.45287**	.65806	**.45505**	38
23	.64972	**.44640**	.65183	**.44857**	.65392	**.45074**	.65601	**.45291**	.65809	**.45508**	37
+ 6′	9.64976	**.44643**	9.65186	**.44860**	9.65396	**.45077**	9.65605	**.45295**	9.65812	**.45512**	36
25	.64979	**.44647**	.65190	**.44864**	.65399	**.45081**	.65608	**.45298**	.65816	**.45515**	35
26	.64983	**.44651**	.65193	**.44868**	.65403	**.45085**	.65612	**.45302**	.65819	**.45519**	34
27	.64986	**.44654**	.65197	**.44871**	.65406	**.45088**	.65615	**.45305**	.65823	**.45523**	33
+ 7′	9.64990	**.44658**	9.65200	**.44875**	9.65410	**.45092**	9.65619	**.45309**	9.65826	**.45526**	32
29	.64993	**.44661**	.65204	**.44878**	.65413	**.45096**	.65622	**.45313**	.65830	**.45530**	31
30	.64997	**.44665**	.65207	**.44882**	.65417	**.45099**	.65625	**.45316**	.65833	**.45534**	30
31	.65000	**.44669**	.65211	**.44886**	.65421	**.45103**	.65629	**.45320**	.65837	**.45537**	29
+ 8′	9.65004	**.44672**	9.65214	**.44889**	9.65424	**.45106**	9.65632	**.45324**	9.65840	**.45541**	28
33	.65007	**.44676**	.65218	**.44893**	.65427	**.45110**	.65636	**.45327**	.65844	**.45544**	27
34	.65011	**.44680**	.65221	**.44897**	.65431	**.45114**	.65639	**.45331**	.65847	**.45548**	26
35	.65014	**.44683**	.65225	**.44900**	.65434	**.45117**	.65643	**.45334**	.65850	**.45552**	25
+ 9′	9.65018	**.44687**	9.65228	**.44904**	9.65438	**.45121**	9.65646	**.45338**	9.65854	**.45555**	24
37	.65021	**.44690**	.65232	**.44907**	.65441	**.45124**	.65650	**.45342**	.65857	**.45559**	23
38	.65025	**.44694**	.65235	**.44911**	.65445	**.45128**	.65653	**.45345**	.65861	**.45563**	22
39	.65028	**.44698**	.65239	**.44915**	.65448	**.45132**	.65657	**.45349**	.65864	**.45566**	21
+ 10′	9.65032	**.44701**	9.65242	**.44918**	9.65452	**.45135**	9.65660	**.45353**	9.65868	**.45570**	20
41	.65035	**.44705**	.65246	**.44922**	.65455	**.45139**	.65664	**.45356**	.65871	**.45573**	19
42	.65039	**.44708**	.65249	**.44925**	.65459	**.45143**	.65667	**.45360**	.65875	**.45577**	18
43	.65043	**.44712**	.65253	**.44929**	.65462	**.45146**	.65671	**.45363**	.65878	**.45581**	17
+ 11′	9.65046	**.44716**	9.65256	**.44933**	9.65466	**.45150**	9.65674	**.45367**	9.65881	**.45584**	16
45	.65050	**.44719**	.65260	**.44936**	.65469	**.45153**	.65677	**.45371**	.65885	**.45588**	15
46	.65053	**.44723**	.65263	**.44940**	.65473	**.45157**	.65681	**.45374**	.65888	**.45592**	14
47	.65057	**.44727**	.65267	**.44944**	.65476	**.45161**	.65684	**.45378**	.65892	**.45595**	13
+ 12′	9.65060	**.44730**	9.65270	**.44947**	9.65480	**.45164**	9.65688	**.45381**	9.65895	**.45599**	12
49	.65064	**.44734**	.65274	**.44951**	.65483	**.45168**	.65691	**.45385**	.65899	**.45602**	11
50	.65067	**.44737**	.65277	**.44954**	.65486	**.45172**	.65695	**.45389**	.65902	**.45606**	10
51	.65071	**.44741**	.65281	**.44958**	.65490	**.45175**	.65698	**.45392**	.65906	**.45610**	9
+ 13′	9.65074	**.44745**	9.65284	**.44962**	9.65493	**.45179**	9.65702	**.45396**	9.65909	**.45613**	8
53	.65078	**.44748**	.65288	**.44965**	.65497	**.45182**	.65705	**.45400**	.65913	**.45617**	7
54	.65081	**.44752**	.65291	**.44969**	.65500	**.45186**	.65709	**.45403**	.65916	**.45620**	6
55	.65085	**.44755**	.65295	**.44973**	.65504	**.45190**	.65712	**.45407**	.65919	**.45624**	5
+ 14′	9.65088	**.44759**	9.65298	**.44976**	9.65507	**.45193**	9.65716	**.45410**	9.65923	**.45628**	4
57	.65092	**.44763**	.65302	**.44980**	.65511	**.45197**	.65719	**.45414**	.65926	**.45631**	3
58	.65095	**.44766**	.65305	**.44983**	.65514	**.45200**	.65722	**.45418**	.65930	**.45635**	2
59	.65099	**.44770**	.65309	**.44987**	.65518	**.45204**	.65726	**.45421**	.65933	**.45639**	1
+ 15′	9.65102	**.44774**	9.65312	**.44991**	9.65521	**.45208**	9.65729	**.45425**	9.65937	**.45642**	0
	$18^h\ 24^m$		$18^h\ 23^m$		$18^h\ 22^m$		$18^h\ 21^m$		$18^h\ 20^m$		

TABLE 45.

Haversines.

	5h 40m 85° 0′		5h 41m 85° 15′		5h 42m 85° 30′		5h 43m 85° 45′		5h 44m 86° 0′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.65937	.45642	9.66143	.45860	9.66348	.46077	9.66553	.46295	9.66757	.46512	60
1	.65940	.45646	.66146	.45863	.66352	.46081	.66556	.46298	.66760	.46516	59
2	.65944	.45649	.66150	.45867	.66355	.46084	.66560	.46302	.66763	.46519	58
3	.65947	.45653	.66153	.45870	.66359	.46088	.66563	.46305	.66767	.46523	57
+ 1′	9.65950	.45657	9.66157	.45874	9.66362	.46092	9.66567	.46309	9.66770	.46527	56
5	.65954	.45660	.66160	.45878	.66366	.46095	.66570	.46313	.66774	.46530	55
6	.65957	.45664	.66164	.45881	.66369	.46099	.66573	.46316	.66777	.46534	54
7	.65961	.45668	.66167	.45885	.66372	.46102	.66577	.46320	.66780	.46538	53
+ 2′	9.65964	.45671	9.66170	.45889	9.66376	.46106	9.66580	.46324	9.66784	.46541	52
9	.65968	.45675	.66174	.45892	.66379	.46110	.66584	.46327	.66787	.46545	51
10	.65971	.45678	.66177	.45896	.66383	.46113	.66587	.46331	.66791	.46548	50
11	.65975	.45682	.66181	.45899	.66386	.46117	.66590	.46334	.66794	.46552	49
+ 3′	9.65978	.45686	9.66184	.45903	9.66389	.46121	9.66594	.46338	9.66797	.46556	48
13	.65981	.45689	.66188	.45907	.66393	.46124	.66597	.46342	.66801	.46559	47
14	.65985	.45693	.66191	.45910	.66396	.46128	.66601	.46345	.66804	.46563	46
15	.65988	.45697	.66194	.45914	.66400	.46131	.66604	.46349	.66807	.46567	45
+ 4′	9.65992	.45700	9.66198	.45918	9.66403	.46135	9.66607	.46353	9.66811	.46570	44
17	.65995	.45704	.66201	.45921	.66407	.46139	.66611	.46356	.66814	.46574	43
18	.65999	.45707	.66205	.45925	.66410	.46142	.66614	.46360	.66818	.46577	42
19	.66002	.45711	.66208	.45928	.66413	.46146	.66618	.46363	.66821	.46581	41
+ 5′	9.66006	.45715	9.66212	.45932	9.66417	.46150	9.66621	.46367	9.66824	.46585	40
21	.66009	.45718	.66215	.45936	.66420	.46153	.66624	.46371	.66828	.46588	39
22	.66012	.45722	.66218	.45939	.66424	.46157	.66628	.46374	.66831	.46592	38
23	.66016	.45726	.66222	.45943	.66427	.46161	.66631	.46378	.66835	.46596	37
+ 6′	9.66019	.45729	9.66225	.45947	9.66430	.46164	9.66635	.46382	9.66838	.46599	36
25	.66023	.45733	.66229	.45950	.66434	.46168	.66638	.46385	.66841	.46603	35
26	.66026	.45736	.66232	.45954	.66437	.46171	.66641	.46389	.66845	.46606	34
27	.66030	.45740	.66236	.45957	.66441	.46175	.66645	.46392	.66848	.46610	33
+ 7′	9.66033	.45744	9.66239	.45961	9.66444	.46179	9.66648	.46396	9.66851	.46614	32
29	.66037	.45747	.66242	.45965	.66447	.46182	.66652	.46400	.66855	.46617	31
30	.66040	.45751	.66246	.45968	.66451	.46186	.66655	.46403	.66858	.46621	30
31	.66043	.45755	.66249	.45972	.66454	.46189	.66658	.46407	.66862	.46625	29
+ 8′	9.66047	.45758	9.66253	.45976	9.66458	.46193	9.66662	.46411	9.66865	.46628	28
33	.66050	.45762	.66256	.45979	.66461	.46197	.66665	.46414	.66868	.46632	27
34	.66054	.45765	.66260	.45983	.66464	.46200	.66669	.46418	.66872	.46636	26
35	.66057	.45769	.66263	.45986	.66468	.46204	.66672	.46421	.66875	.46639	25
+ 9′	9.66061	.45773	9.66266	.45990	9.66471	.46208	9.66675	.46425	9.66878	.46643	24
37	.66064	.45776	.66270	.45994	.66475	.46211	.66679	.46429	.66882	.46646	23
38	.66067	.45780	.66273	.45997	.66478	.46215	.66682	.46432	.66885	.46650	22
39	.66071	.45783	.66277	.46001	.66482	.46218	.66685	.46436	.66889	.46654	21
+ 10′	9.66074	.45787	9.66280	.46005	9.66485	.46222	9.66689	.46440	9.66892	.46657	20
41	.66078	.45791	.66284	.46008	.66488	.46226	.66692	.46443	.66895	.46661	19
42	.66081	.45794	.66287	.46012	.66492	.46229	.66696	.46447	.66899	.46665	18
43	.66085	.45798	.66290	.46015	.66495	.46233	.66699	.46451	.66902	.46668	17
+ 11′	9.66088	.45802	9.66294	.46019	9.66499	.46237	9.66702	.46454	9 66905	.46672	16
45	.66092	.45805	.66297	.46023	.66502	.46240	.66706	.46458	.66909	.46675	15
46	.66095	.45809	.66301	.46026	.66505	.46244	.66709	.46461	.66912	.46679	14
47	.66098	.45812	.66304	.46030	.66509	.46247	.66713	.46465	.66916	.46683	13
+ 12′	9.66102	.45816	9.66307	.46034	9.66512	.46251	9.66716	.46469	9.66919	.46686	12
49	.66105	.45820	.66311	.46037	.66516	.46255	.66719	.46472	.66922	.46690	11
50	.66109	.45823	.66314	.46041	.66519	.46258	.66723	.46476	.66926	.46694	10
51	.66112	.45827	.66318	.46044	.66522	.46262	.66726	.46480	.66929	.46697	9
+ 13′	9.66116	.45831	9.66321	.46048	9.66526	.46266	9.66730	.46483	9.66932	.46701	8
53	.66119	.45834	.66325	.46052	.66529	.46269	.66733	.46487	.66936	.46704	7
54	.66122	.45838	.66328	.46055	.66533	.46273	.66736	.46490	.66939	.46708	6
55	.66126	.45841	.66331	.46059	.66536	.46276	.66740	.46494	.66943	.46712	5
+ 14′	9.66129	.45845	9.66335	.46063	9.66539	.46280	9.66743	.46498	9.66946	.46715	4
57	.66133	.45849	.66338	.46066	.66543	.46284	.66747	.46501	.66949	.46719	3
58	.66136	.45852	.66342	.46070	.66546	.46287	.66750	.46505	.66953	.46723	2
59	.66140	.45856	.66345	.46073	.66550	.46291	.66753	.46509	.66956	.46726	1
+ 15′	9.66143	.45860	9.66348	.46077	9.66553	.46295	9.66757	.46512	9.66959	.46730	0
	18h 19m		18h 18m		18h 17m		18h 16m		18h 15m		

TABLE 45.

Haversines.

	$5^h\,45^m$ 86° 15′		$5^h\,46^m$ 86° 30′		$5^h\,47^m$ 86° 45′		$5^h\,48^m$ 87° 0′		$5^h\,49^m$ 87° 15′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.66959	**.46730**	9.67161	**.46948**	9.67362	**.47165**	9.67562	**.47383**	9.67762	**.47601**	60
1	.66963	**.46733**	.67165	**.46951**	.67366	**.47169**	.67566	**.47387**	.67765	**.47605**	59
2	.66966	**.46737**	.67168	**.46955**	.67369	**.47173**	.67569	**.47390**	.67768	**.47608**	58
3	.66970	**.46741**	.67171	**.46958**	.67372	**.47176**	.67572	**.47394**	.67772	**.47612**	57
+ 1′	9.66973	**.46744**	9.67175	**.46962**	9.67376	**.47180**	9.67576	**.47398**	9.67775	**.47616**	56
5	.66976	**.46748**	.67178	**.46966**	.67379	**.47184**	.67579	**.47401**	.67778	**.47619**	55
6	.66980	**.46752**	.67181	**.46969**	.67382	**.47187**	.67582	**.47405**	.67782	**.47623**	54
7	.66983	**.46755**	.67185	**.46973**	.67386	**.47191**	.67586	**.47409**	.67785	**.47627**	53
+ 2′	9.66986	**.46759**	9.67188	**.46977**	9.67389	**.47194**	9.67589	**.47412**	9.67788	**.47630**	52
9	.66990	**.46762**	.67192	**.46980**	.67392	**.47198**	.67592	**.47416**	.67792	**.47634**	51
10	.66993	**.46766**	.67195	**.46984**	.67396	**.47202**	.67596	**.47420**	.67795	**.47637**	50
11	.66997	**.46770**	.67198	**.46987**	.67399	**.47205**	.67599	**.47423**	.67798	**.47641**	49
+ 3′	9.67000	**.46773**	9.67202	**.46991**	9.67402	**.47209**	9.67602	**.47427**	9.67801	**.47645**	48
13	.67003	**.46777**	.67205	**.46995**	.67406	**.47213**	.67606	**.47430**	.67805	**.47648**	47
14	.67007	**.46781**	.67208	**.46998**	.67409	**.47216**	.67609	**.47434**	.67808	**.47652**	46
15	.67010	**.46784**	.67212	**.47002**	.67412	**.47220**	.67612	**.47438**	.67811	**.47656**	45
+ 4′	9.67013	**.46788**	9.67215	**.47006**	9.67416	**.47223**	9.67616	**.47441**	9.67815	**.47659**	44
17	.67017	**.46792**	.67218	**.47009**	.67419	**.47227**	.67619	**.47445**	.67818	**.47663**	43
18	.67020	**.46795**	.67222	**.47013**	.67422	**.47231**	.67622	**.47449**	.67821	**.47666**	42
19	.67023	**.46799**	.67225	**.47017**	.67426	**.47234**	.67626	**.47452**	.67825	**.47670**	41
+ 5′	9.67027	**.46802**	9.67228	**.47020**	9.67429	**.47238**	9.67629	**.47456**	9.67828	**.47674**	40
21	.67030	**.46806**	.67232	**.47024**	.67432	**.47242**	.67632	**.47459**	.67831	**.47677**	39
22	.67034	**.46810**	.67235	**.47027**	.67436	**.47245**	.67636	**.47463**	.67835	**.47681**	38
23	.67037	**.46813**	.67238	**.47031**	.67439	**.47249**	.67639	**.47467**	.67838	**.47685**	37
+ 6′	9.67040	**.46817**	9.67242	**.47035**	9.67443	**.47252**	9.67642	**.47470**	9.67841	**.47688**	36
25	.67044	**.46821**	.67245	**.47038**	.67446	**.47256**	.67646	**.47474**	.67844	**.47692**	35
26	.67047	**.46824**	.67249	**.47042**	.67449	**.47260**	.67649	**.47478**	.67848	**.47636**	34
27	.67050	**.46828**	.67252	**.47046**	.67452	**.47263**	.67652	**.47481**	.67851	**.47699**	33
+ 7′	9.67054	**.46831**	9.67255	**.47049**	9.67456	**.47267**	9.67656	**.47485**	9.67854	**.47703**	32
29	.67057	**.46835**	.67259	**.47053**	.67459	**.47271**	.67659	**.47489**	.67858	**.47706**	31
30	.67060	**.46839**	.67262	**.47056**	.67462	**.47274**	.67662	**.47492**	.67861	**.47710**	30
31	.67064	**.46842**	.67265	**.47060**	.67466	**.47278**	.67666	**.47496**	.67864	**.47714**	29
+ 8′	9.67067	**.46846**	9.67269	**.47064**	9.67469	**.47282**	9.67669	**.47499**	9.67868	**.47717**	28
33	.67071	**.46850**	.67272	**.47067**	.67472	**.47285**	.67672	**.47503**	.67871	**.47721**	27
34	.67074	**.46853**	.67275	**.47071**	.67476	**.47289**	.67675	**.47507**	.67874	**.47725**	26
35	.67077	**.46857**	.67279	**.47075**	.67479	**.47292**	.67679	**.47510**	.67878	**.47728**	25
+ 9′	9.67081	**.46860**	9.67282	**.47078**	9.67483	**.47296**	9.67682	**.47514**	9.67881	**.47732**	24
37	.67084	**.46864**	.67285	**.47082**	.67486	**.47300**	.67685	**.47518**	.67884	**.47735**	23
38	.67087	**.46868**	.67289	**.47086**	.67489	**.47303**	.67689	**.47521**	.67887	**.47739**	22
39	.67091	**.46871**	.67292	**.47089**	.67493	**.47307**	.67692	**.47525**	.67891	**.47743**	21
+ 10′	9.67094	**.46875**	9.67295	**.47093**	9.67496	**.47311**	9.67695	**.47528**	9.67894	**.47746**	20
41	.67097	**.46879**	.67299	**.47096**	.67499	**.47314**	.67699	**.47532**	.67897	**.47750**	19
42	.67101	**.46882**	.67302	**.47100**	.67503	**.47318**	.67702	**.47536**	.67901	**.47754**	18
43	.67104	**.46886**	.67305	**.47104**	.67506	**.47321**	.67705	**.47539**	.67904	**.47757**	17
+ 11′	9.67108	**.46890**	9.67309	**.47107**	9.67509	**.47325**	9.67709	**.47543**	9.67907	**.47761**	16
45	.67111	**.46893**	.67312	**.47111**	.67512	**.47329**	.67712	**.47547**	.67911	**.47765**	15
46	.67114	**.46897**	.67315	**.47115**	.67516	**.47332**	.67715	**.47550**	.67914	**.47768**	14
47	.67118	**.46900**	.67319	**.47118**	.67519	**.47336**	.67719	**.47554**	.67917	**.47772**	13
+ 12′	9.67121	**.46904**	9.67322	**.47122**	9.67522	**.47340**	9.67722	**.47558**	9.67920	**.47775**	12
49	.67124	**.46908**	.67326	**.47125**	.67526	**.47343**	.67725	**.47561**	.67924	**.47779**	11
50	.67128	**.46911**	.67329	**.47129**	.67529	**.47347**	.67729	**.47565**	.67927	**.47783**	10
51	.67131	**.46915**	.67332	**.47123**	.67532	**.47351**	.67732	**.47568**	.67930	**.47786**	9
+ 13′	9.67134	**.46919**	9.67336	**.47136**	9.67536	**.47354**	9.67735	**.47572**	9.67934	**.47790**	8
53	.67138	**.46922**	.67339	**.47140**	.67539	**.47358**	.67738	**.47576**	.67937	**.47794**	7
54	.67141	**.46926**	.67342	**.47144**	.67542	**.47361**	.67742	**.47579**	.67940	**.47797**	6
55	.67145	**.46929**	.67346	**.47147**	.67546	**.47365**	.67745	**.47583**	.67944	**.47801**	5
+ 14′	9.67148	**.46933**	9.67349	**.47151**	9.67549	**.47369**	9.67748	**.47587**	9.67947	**.47805**	4
57	.67151	**.46937**	.67352	**.47155**	.67552	**.47372**	.67752	**.47590**	.67950	**.47808**	3
58	.67155	**.46940**	.67356	**.47158**	.67556	**.47376**	.67755	**.47594**	.67953	**.47812**	2
59	.67158	**.46944**	.67359	**.47162**	.67559	**.47380**	.67758	**.47597**	.67957	**.47815**	1
+ 15′	9.67161	**.46948**	9.67362	**.47165**	9.67562	**.47383**	9.67762	**.47601**	9.67960	**.47819**	0
	$18^h\,14^m$		$18^h\,13^m$		$18^h\,12^m$		$18^h\,11^m$		$18^h\,10^m$		

TABLE 45.

Haversines.

s	$5^h\ 50^m$ 87° 30′		$5^h\ 51^m$ 87° 45′		$5^h\ 52^m$ 88° 0′		$5^h\ 53^m$ 88° 15′		$5^h\ 54^m$ 88° 30′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.67960	.47819	9.68158	.48037	9.68354	.48255	9.68550	.48473	9.68745	.48691	60
1	.67963	.47823	.68161	.48041	.68358	.48259	.68553	.48477	.68748	.48695	59
2	.67967	.47826	.68164	.48044	.68361	.48262	.68557	.48480	.68751	.48698	58
3	.67970	.47830	.68167	.48048	.68364	.48266	.68560	.48484	.68755	.48702	57
+ 1′	9.67973	.47834	9.68171	.48052	9.68367	.48269	9.68563	.48488	9.68758	.48706	56
5	.67977	.47837	.68174	.48055	.68371	.48273	.68566	.48491	.68761	.48709	55
6	.67980	.47841	.68177	.48059	.68374	.48277	.68570	.48495	.68764	.48713	54
7	.67983	.47844	.68181	.48062	.68377	.48280	.68573	.48499	.68768	.48717	53
+ 2′	9.67986	.47848	9.68184	.48066	9.68380	.48284	9.68576	.48502	9.68771	.48720	52
9	.67990	.47852	.68187	.48070	.68384	.48288	.68579	.48506	.68774	.48724	51
10	.67993	.47855	.68190	.48073	.68387	.48291	.68583	.48509	.68777	.48728	50
11	.67996	.47859	.68194	.48077	.68390	.48295	.68586	.48513	.68781	.48731	49
+ 3′	9.68000	.47863	9.68197	.48081	9.68393	.48299	9.68589	.48517	9.68784	.48735	48
13	.68003	.47866	.68200	.48084	.68397	.48302	.68592	.48520	.68787	.48738	47
14	.68006	.47870	.68204	.48088	.68400	.48306	.68596	.48524	.68790	.48742	46
15	.68010	.47874	.68207	.48092	.68403	.48310	.68599	.48528	.68794	.48746	45
+ 4′	9.68013	.47877	9.68210	.48095	9.68407	.48313	9.68602	.48531	9.68797	.48749	44
17	.68016	.47881	.68213	.48099	.68410	.48317	.68605	.48535	.68800	.48753	43
18	.68019	.47884	.68217	.48102	.68413	.48320	.68609	.48538	.68803	.48757	42
19	.68023	.47888	.68220	.48166	.68416	.48324	.68612	.48542	.68806	.48760	41
+ 5′	9.68026	.47892	9.68223	.48110	9.68420	.48328	9.68615	.48546	9.68810	.48764	40
21	.68029	.47895	.68227	.48113	.68423	.48331	.68618	.48549	.68813	.48767	39
22	.68033	.47899	.68230	.48117	.68426	.48335	.68622	.48553	.68816	.48771	38
23	.68036	.47903	.68233	.48121	.68429	.48339	.68625	.48557	.68820	.48775	37
+ 6′	9.68039	.47906	9.68236	.48124	9.68433	.48342	9.68628	.48560	9.68823	.48778	36
25	.68042	.47910	.68240	.48128	.68436	.48346	.68631	.48564	.68826	.48782	35
26	.68046	.47913	.68243	.48131	.68439	.48350	.68635	.48568	.68829	.48786	34
27	.68049	.47917	.68246	.48135	.68442	.48353	.68638	.48571	.68832	.48789	33
+ 7′	9.68052	.47921	9.68249	.48139	9.68446	.48357	9.68641	.48575	9.68836	.48793	32
29	.68056	.47924	.68253	.48142	.68449	.48360	.68644	.48578	.68839	.48797	31
30	.68059	.47928	.68256	.48146	.68452	.48364	.68648	.48582	.68842	.48800	30
31	.68062	.47932	.68259	.48150	.68456	.48368	.68651	.48586	.68845	.48804	29
+ 8′	9.68066	.47935	9.68263	.48153	9.68459	.48371	9.68654	.48589	9.68849	.48807	28
33	.68069	.47939	.68266	.48157	.68462	.48375	.68657	.48593	.68852	.48811	27
34	.68072	.47943	.68269	.48161	.68465	.48379	.68661	.48597	.68855	.48815	26
35	.68075	.47946	.68272	.48164	.68469	.48382	.68664	.48600	.68858	.48818	25
+ 9′	9.68079	.47950	9.68276	.48168	9.68472	.48386	9.68667	.48604	9.68862	.48822	24
37	.68082	.47953	.68279	.48171	.68475	.48389	.68670	.48608	.68865	.48826	23
38	.68085	.47957	.68282	.48175	.68478	.48393	.68674	.48611	.68868	.48829	22
39	.68089	.47961	.68286	.48179	.68482	.48397	.68677	.48615	.68871	.48833	21
+ 10′	9.68092	.47964	9.68289	.48182	9.68485	.48400	9.68680	.48618	9.68875	.48837	20
41	.68095	.47968	.68292	.48186	.68488	.48404	.68683	.48622	.68878	.48840	19
42	.68098	.47972	.68295	.48190	.68491	.48408	.68687	.48626	.68881	.48844	18
43	.68102	.47975	.68299	.48193	.68495	.48411	.68690	.48629	.68884	.48847	17
+ 11′	9.68105	.47979	9.68302	.48197	9.68498	.48415	9.68693	.48633	9.68887	.48851	16
45	.68108	.47983	.68305	.48201	.68501	.48419	.68696	.48637	.68891	.48855	15
46	.68112	.47986	.68308	.48204	.68504	.48422	.68700	.48640	.68894	.48858	14
47	.68115	.47990	.68312	.48208	.68508	.48426	.68703	.48614	.68897	.48862	13
+ 12′	9.68118	.47993	9.68315	.48211	9.68511	.48429	9.68706	.48648	9.68900	.48866	12
49	.68121	.47997	.68318	.48215	.68514	.48433	.68709	.48651	.68904	.48869	11
50	.68125	.48001	.68322	.48219	.68517	.48437	.68713	.48655	.68907	.48873	10
51	.68128	.48004	.68325	.48222	.68521	.48440	.68716	.48658	.68910	.48877	9
+ 13′	9.68131	.48008	9.68328	.48226	9.68524	.48444	9.68719	.48662	9.68913	.48880	8
53	.68135	.48012	.68331	.48230	.68527	.48448	.68722	.48666	.68917	.48884	7
54	.68138	.48015	.68335	.48233	.68531	.48451	.68726	.48669	.68920	.48887	6
55	.68141	.48019	.68338	.48237	.68534	.48455	.68729	.48673	.68923	.48891	5
+ 14′	9.68144	.48022	9.68341	.48241	9.68537	.48459	9.68732	.48677	9.68926	.48895	4
57	.68148	.48026	.68344	.48244	.68540	.48462	.68735	.48680	.68929	.48898	3
58	.68151	.48030	.68348	.48248	.68544	.48466	.68739	.48684	.68933	.48902	2
59	.68154	.48033	.68351	.48251	.68547	.48469	.68742	.46688	.68936	.48906	1
+ 15′	9.68158	.48037	9.68354	.48255	9.68550	.48473	9.68745	.48691	9.68939	.48909	0
	$18^h\ 9^m$		$18^h\ 8^m$		$18^h\ 7^m$		$18^h\ 6^m$		$18^h\ 5^m$		

TABLE 45.

Haversines.

s	$5^h\ 55^m$ **88° 45′**		$5^h\ 56^m$ **89° 0′**		$5^h\ 57^m$ **89° 15′**		$5^h\ 58^m$ **89° 30′**		$5^h\ 59^m$ **89° 45′**		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.68939	**.48909**	9.69132	**.49127**	9.69325	**.49346**	9.69516	**.49564**	9.69707	**.49782**	60
1	.68942	**.48913**	.69136	**.49131**	.69328	**.49349**	.69520	**.49567**	.69710	**.49785**	59
2	.68946	**.48917**	.69139	**.49135**	.69331	**.49353**	.69523	**.49571**	.69713	**.49789**	58
3	.68949	**.48920**	.69142	**.49138**	.69334	**.49356**	.69526	**.49575**	.69717	**.49793**	57
+ **1′**	9.68952	**.48924**	9.69145	**.49142**	9.69338	**.49360**	9.69529	**.49578**	9.69720	**.49796**	56
5	.68955	**.48927**	.69148	**.49146**	.69341	**.49364**	.69532	**.49582**	.69723	**.49800**	55
6	.68958	**.48931**	.69152	**.49149**	.69344	**.49367**	.69535	**.49585**	.69726	**.49804**	54
7	.68962	**.48935**	.69155	**.49153**	.69347	**.49371**	.69539	**.49589**	.69729	**.49807**	53
+ **2′**	9.68965	**.48938**	9.69158	**.49156**	9.69350	**.49375**	9.69542	**.49593**	9.69732	**.49811**	52
9	.68968	**.48942**	.69161	**.49160**	.69354	**.49378**	.69545	**.49596**	.69736	**.49815**	51
10	.68971	**.48946**	.69164	**.49164**	.69357	**.49382**	.69548	**.49600**	.69739	**.49818**	50
11	.68975	**.48949**	.69168	**.49167**	.69360	**.49386**	.69551	**.49604**	.69742	**.49822**	49
+ **3′**	9.68978	**.48953**	9.69171	**.49171**	9.69363	**.49389**	9.69555	**.49607**	9.69745	**.49825**	48
13	.68981	**.48957**	.69174	**.49175**	.69366	**.49393**	.69558	**.49611**	.69748	**.49829**	47
14	.68984	**.48960**	.69177	**.49178**	.69370	**.49396**	.69561	**.49615**	.69751	**.49833**	46
15	.68988	**.48964**	.69181	**.49182**	.69373	**.49400**	.69564	**.49618**	.69755	**.49836**	45
+ **4′**	9.68991	**.48967**	9.69184	**.49186**	9.69376	**.49404**	9.69567	**.49622**	9.69758	**.49840**	44
17	.68994	**.48971**	.69187	**.49189**	.69379	**.49407**	.69570	**.49625**	.69761	**.49844**	43
18	.68997	**.48975**	.69190	**.49193**	.69382	**.49411**	.69574	**.49629**	.69764	**.49847**	42
19	.69000	**.48978**	.69193	**.49196**	.69386	**.49415**	.69577	**.49633**	.69767	**.49851**	41
+ **5′**	9.69004	**.48982**	9.69197	**.49200**	9.69389	**.49418**	9.69580	**.49636**	9.69770	**.49855**	40
21	.69007	**.48986**	.69200	**.49204**	.69392	**.49422**	.69583	**.49640**	.69774	**.49858**	39
22	.69010	**.48989**	.69203	**.49207**	.69395	**.49426**	.69586	**.49644**	.69777	**.49862**	38
23	.69013	**.48993**	.69206	**.49211**	.69398	**.49429**	.69590	**.49647**	.69780	**.49865**	37
+ **6′**	9.69017	**.48997**	9.69209	**.49215**	9.69402	**.49433**	9.69593	**.49651**	9.69783	**.49869**	36
25	.69020	**.49000**	.69213	**.49218**	.69405	**.49436**	.69596	**.49655**	.69786	**.49873**	35
26	.69023	**.49004**	.69216	**.49222**	.69408	**.49440**	.69599	**.49658**	.69789	**.49876**	34
27	.69026	**.49007**	.69219	**.49226**	.69411	**.49444**	.69602	**.49662**	.69793	**.49880**	33
+ **7′**	9.69029	**.49011**	9.69222	**.49229**	9.69414	**.49447**	9.69605	**.49665**	9.69796	**.49884**	32
29	.69033	**.49015**	.69225	**.49233**	.69417	**.49451**	.69609	**.49669**	.69799	**.49887**	31
30	.69036	**.49018**	.69229	**.49236**	.69421	**.49455**	.69612	**.49673**	.69802	**.49891**	30
31	.69039	**.49022**	.69232	**.49240**	.69424	**.49458**	.69615	**.49676**	.69805	**.49895**	29
+ **8′**	9.69042	**.49026**	9.69235	**.49244**	9.69427	**.49462**	9.69618	**.49680**	9.69808	**.49898**	28
33	.69046	**.49029**	.69238	**.49247**	.69430	**.49465**	.69621	**.49684**	.69812	**.49902**	27
34	.69049	**.49033**	.69242	**.49251**	.69433	**.49469**	.69625	**.49687**	.69815	**.49905**	26
35	.69052	**.49036**	.69245	**.49255**	.69437	**.49473**	.69628	**.49691**	.69818	**.49909**	25
+ **9′**	9.69055	**.49040**	9.69248	**.49258**	9.69440	**.49476**	9.69631	**.49695**	9.69821	**.49913**	24
37	.69058	**.49044**	.69251	**.49262**	.69443	**.49480**	.69634	**.49698**	.69824	**.49916**	23
38	.69062	**.49047**	.69254	**.49266**	.69446	**.49484**	.69637	**.49702**	.69827	**.49920**	22
39	.69065	**.49051**	.69258	**.49269**	.69449	**.49487**	.69640	**.49705**	.69831	**.49924**	21
+ **10′**	9.69068	**.49055**	9.69261	**.49273**	9.69453	**.49491**	9.69644	**.49709**	9.69834	**.49927**	20
41	.69071	**.49058**	.69264	**.49276**	.69456	**.49495**	.69647	**.49713**	.69837	**.49931**	19
42	.69074	**.49062**	.69267	**.49280**	.69459	**.49498**	.69650	**.49716**	.69840	**.49935**	18
43	.69078	**.49066**	.69270	**.49284**	.69462	**.49502**	.69653	**.49720**	.69843	**.49938**	17
+ **11′**	9.69081	**.49069**	9.69274	**.49287**	9.69465	**.49506**	9.69656	**.49724**	9.69846	**.49942**	16
45	.69084	**.49073**	.69277	**.49291**	.69469	**.49509**	.69659	**.49727**	.69850	**.49945**	15
46	.69087	**.49076**	.69280	**.49295**	.69472	**.49513**	.69663	**.49731**	.69853	**.49949**	14
47	.69091	**.49080**	.69283	**.49298**	.69475	**.49516**	.69666	**.49735**	.69856	**.49953**	13
+ **12′**	9.69094	**.49084**	9.69286	**.49302**	9.69478	**.49520**	9.69669	**.49738**	9.69859	**.49956**	12
49	.69097	**.49087**	.69290	**.49306**	.69481	**.49524**	.69672	**.49742**	.69862	**.49960**	11
50	.69100	**.49091**	.69293	**.49309**	.69484	**.49527**	.69675	**.49745**	.69865	**.49964**	10
51	.69103	**.49095**	.69296	**.49313**	.69488	**.49531**	.69678	**.49749**	.69869	**.49967**	9
+ **13′**	9.69107	**.49098**	9.69299	**.49316**	9.69491	**.49535**	9.69682	**.49753**	9.69872	**.49971**	8
53	.69110	**.49102**	.69302	**.49320**	.69494	**.49538**	.69685	**.49756**	.69875	**.49975**	7
54	.69113	**.49106**	.69306	**.49324**	.69497	**.49542**	.69688	**.49760**	.69878	**.49978**	6
55	.69116	**.49109**	.69309	**.49327**	.69500	**.49545**	.69691	**.49764**	.69881	**.49982**	5
+ **14′**	9.69120	**.49113**	9.69312	**.49331**	9.69504	**.49549**	9.69694	**.49767**	9.69884	**.49985**	4
57	.69123	**.49116**	.69315	**.49335**	.69507	**.49553**	.69698	**.49771**	.69888	**.49989**	3
58	.69126	**.49120**	.69318	**.49338**	.69510	**.49556**	.69701	**.49775**	.69891	**.49993**	2
59	.69129	**.49124**	.69322	**.49342**	.69513	**.49560**	.69704	**.49778**	.69894	**.49997**	1
+ **15′**	9.69132	**.49127**	9.69325	**.49346**	9.69516	**.49564**	9.69707	**.49782**	9.69897	**.50000**	0
	$18^h\ 4^m$		$18^h\ 3^m$		$18^h\ 2^m$		$18^h\ 1^m$		$18^h\ 0^m$		

TABLE 45.

Haversines.

s	$6^h\ 0^m$ **90° 0′**		$6^h\ 1^m$ **96° 15′**		$6^h\ 2^m$ **90° 30′**		$6^h\ 3^m$ **90° 45′**		$6^h\ 4^m$ **91° 0′**		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.69897	**.50000**	9.70086	**.50218**	9.70274	**.50436**	9.70462	**.50654**	9.70648	**.50873**	*60*
1	.69900	**.50004**	.70089	**.50222**	.70277	**.50440**	.70465	**.50658**	.70652	**.50876**	*59*
2	.69903	**.50007**	.70092	**.50225**	.70281	**.50444**	.70468	**.50662**	.70655	**.50880**	*58*
3	.69906	**.50011**	.70096	**.50229**	.70284	**.50447**	.70471	**.50665**	.70658	**.50884**	*57*
+ **1′**	9.69910	**.50015**	9.70099	**.50233**	9.70287	**.50451**	9.70474	**.50669**	9.70661	**.50887**	*56*
5	.69913	**.50018**	.70102	**.50236**	.70290	**.50455**	.70477	**.50673**	.70664	**.50891**	*55*
6	.69916	**.50022**	.70105	**.50240**	.70293	**.50458**	.70480	**.50676**	.70667	**.50894**	*54*
7	.69919	**.50025**	.70108	**.50244**	.70296	**.50462**	.70484	**.50680**	.70670	**.50898**	*53*
+ **2′**	9.69922	**.50029**	9.70111	**.50247**	9.70299	**.50465**	9.70487	**.50684**	9.70673	**.50902**	*52*
9	.69925	**.50033**	.70114	**.50251**	.70303	**.50469**	.70490	**.50687**	.70676	**.50905**	*51*
10	.69929	**.50036**	.70118	**.50255**	.70306	**.50473**	.70493	**.50691**	.70679	**.50909**	*50*
11	.69932	**.50040**	.70121	**.50258**	.70309	**.50476**	.70496	**.50694**	.70683	**.50913**	*49*
+ **3′**	9.69935	**.50044**	9.70124	**.50262**	9.70312	**.50480**	9.70499	**.50698**	9.70686	**.50916**	*48*
13	.69938	**.50047**	.70127	**.50265**	.70315	**.50484**	.70502	**.50702**	.70689	**.50920**	*47*
14	.69941	**.50051**	.70130	**.50269**	.70318	**.50487**	.70505	**.50705**	.70692	**.50924**	*46*
15	.69944	**.50055**	.70133	**.50273**	.70321	**.50491**	.70509	**.50709**	.70695	**.50927**	*45*
+ **4′**	9.69948	**.50058**	9.70136	**.50276**	9.70324	**.50495**	9.70512	**.50713**	9.70698	**.50931**	*44*
17	.69951	**.50062**	.70140	**.50280**	.70328	**.50498**	.70515	**.50716**	.70701	**.50934**	*43*
18	.69954	**.50065**	.70143	**.50284**	.70331	**.50502**	.70518	**.50720**	.70704	**.50938**	*42*
19	.69957	**.50069**	.70146	**.50287**	.70334	**.50505**	.70521	**.50724**	.70707	**.50942**	*41*
+ **5′**	9.69960	**.50073**	9.70149	**.50291**	9.70337	**.50509**	9.70524	**.50727**	9.70710	**.50945**	*40*
21	.69963	**.50076**	.70152	**.50295**	.70340	**.50513**	.70527	**.50731**	.70714	**.50949**	*39*
22	.69966	**.50080**	.70155	**.50298**	.70343	**.50516**	.70530	**.50734**	.70717	**.50953**	*38*
23	.69970	**.50084**	.70158	**.50302**	.70346	**.50520**	.70533	**.50738**	.70720	**.50956**	*37*
+ **6′**	9.69973	**.50087**	9.70161	**.50305**	9.70349	**.50524**	9.70537	**.50742**	9.70723	**.50960**	*36*
25	.69976	**.50091**	.70165	**.50309**	.70353	**.50527**	.70540	**.50745**	.70726	**.50964**	*35*
26	.69979	**.50095**	.70168	**.50313**	.70356	**.50531**	.70543	**.50749**	.70729	**.50967**	*34*
27	.69982	**.50098**	.70171	**.50316**	.70359	**.50534**	.70546	**.50753**	.70732	**.50971**	*33*
+ **7′**	9.69985	**.50102**	9.70174	**.50320**	9.70362	**.50538**	9.70549	**.50756**	9.70735	**.50974**	*32*
29	.69988	**.50105**	.70177	**.50324**	.70365	**.50542**	.70552	**.50760**	.70738	**.50978**	*31*
30	.69992	**.50109**	.70180	**.50327**	.70368	**.50545**	.70555	**.50764**	.70741	**.50982**	*30*
31	.69995	**.50113**	.70183	**.50331**	.70371	**.50549**	.70558	**.50767**	.70745	**.50985**	*29*
+ **8′**	9.69998	**.50116**	9.70187	**.50335**	9.70374	**.50553**	9.70561	**.50771**	9.70748	**.50989**	*28*
33	.70001	**.50120**	.70190	**.50338**	.70378	**.50556**	.70565	**.50774**	.70751	**.50993**	*27*
34	.70004	**.50124**	.70193	**.50342**	.70381	**.50560**	.70568	**.50778**	.70754	**.50996**	*26*
35	.70007	**.50127**	.70196	**.50345**	.70384	**.50564**	.70571	**.50782**	.70757	**.51000**	*25*
+ **9′**	9.70011	**.50131**	9.70199	**.50349**	9.70387	**.50567**	9.70574	**.50785**	9.70760	**.51004**	*24*
37	.70014	**.50135**	.70202	**.50353**	.70390	**.50571**	.70577	**.50789**	.70763	**.51007**	*23*
38	.70017	**.50138**	.70205	**.50356**	.70393	**.50574**	.70580	**.50793**	.70766	**.51011**	*22*
39	.70020	**.50142**	.70209	**.50360**	.70396	**.50578**	.70583	**.50796**	.70769	**.51014**	*21*
+ **10′**	9.70023	**.50145**	9.70212	**.50364**	9.70399	**.50582**	9.70586	**.50800**	9.70772	**.51018**	*20*
41	.70026	**.50149**	.70215	**.50367**	.70402	**.50585**	.70589	**.50804**	.70775	**.51022**	*19*
42	.70029	**.50153**	.70218	**.50371**	.70406	**.50589**	.70593	**.50807**	.70779	**.51025**	*18*
43	.70033	**.50156**	.70221	**.50375**	.70409	**.50593**	.70596	**.50811**	.70782	**.51029**	*17*
+ **11′**	9.70036	**.50160**	9.70224	**.50378**	9.70412	**.50596**	9.70599	**.50814**	9.70785	**.51033**	*16*
45	.70039	**.50164**	.70227	**.50382**	.70415	**.50600**	.70602	**.50818**	.70788	**.51036**	*15*
46	.70042	**.50167**	.70230	**.50385**	.70418	**.50604**	.70605	**.50822**	.70791	**.51040**	*14*
47	.70045	**.50171**	.70234	**.50389**	.70421	**.50607**	.70608	**.50825**	.70794	**.51043**	*13*
+ **12′**	9.70048	**.50175**	9.70237	**.50393**	9.70424	**.50611**	9.70611	**.50829**	9.70797	**.51047**	*12*
49	.70051	**.50178**	.70240	**.50396**	.70427	**.50614**	.70614	**.50833**	.70800	**.51051**	*11*
50	.70055	**.50182**	.70243	**.50400**	.70431	**.50618**	.70617	**.50836**	.70803	**.51054**	*10*
51	.70058	**.50185**	.70246	**.50404**	.70434	**.50622**	.70620	**.50840**	.70806	**.51058**	*9*
+ **13′**	9.70061	**.50189**	9.70249	**.50407**	9.70437	**.50625**	9.70624	**.50844**	9.70809	**.51062**	*8*
53	.70064	**.50193**	.70252	**.50411**	.70440	**.50629**	.70627	**.50847**	.70813	**.51065**	*7*
54	.70067	**.50196**	.70256	**.50415**	.70443	**.50633**	.70630	**.50851**	.70816	**.51069**	*6*
55	.70070	**.50200**	.70259	**.50418**	.70446	**.50636**	.70633	**.50854**	.70819	**.51073**	*5*
+ **14′**	9.70074	**.50204**	9.70262	**.50422**	9.70449	**.50640**	9.70636	**.50858**	9.70822	**.51076**	*4*
57	.70077	**.50207**	.70265	**.50425**	.70452	**.50644**	.70639	**.50862**	.70825	**.51080**	*3*
58	.70080	**.50211**	.70268	**.50429**	.70456	**.50647**	.70642	**.50865**	.70828	**.51083**	*2*
59	.70083	**.50215**	.70271	**.50433**	.70459	**.50651**	.70645	**.50869**	.70831	**.51087**	*1*
+ **15′**	9.70086	**.50218**	9.70274	**.50436**	9.70462	**.50654**	9.70648	**.50873**	9.70834	**.51091**	*0*
	$17^h\ 59^m$		$17^h\ 58^m$		$17^h\ 57^m$		$17^h\ 56^m$		$17^h\ 55^m$		

TABLE 45.

Haversines.

	$6^h\ 5^m$ 91° 15′		$6^h\ 6^m$ 91° 30′		$6^h\ 7^m$ 91° 45′		$6^h\ 8^m$ 92° 0′		$6^h\ 9^m$ 92° 15′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.70834	**.51091**	9.71019	**.51309**	9.71203	**.51527**	9.71387	**.51745**	9.71569	**.51963**	60
1	.70837	**.51094**	.71022	**.51312**	.71206	**.51531**	.71390	**.51749**	.71572	**.51967**	59
2	.70840	**.51098**	.71025	**.51316**	.71210	**.51534**	.71393	**.51752**	.71575	**.51970**	58
3	.70843	**.51102**	.71028	**.51320**	.71213	**.51538**	.71396	**.51756**	.71579	**.51974**	57
+ 1′	9.70847	**.51105**	9.71032	**.51323**	9.71216	**.51541**	9.71399	**.51760**	9.71582	**.51978**	56
5	.70850	**.51109**	.71035	**.51327**	.71219	**.51545**	.71402	**.51763**	.71585	**.51981**	55
6	.70853	**.51113**	.71038	**.51331**	.71222	**.51549**	.71405	**.51767**	.71588	**.51985**	54
7	.70856	**.51116**	.71041	**.51334**	.71225	**.51552**	.71408	**.51770**	.71591	**.51988**	53
+ 2′	9.70859	**.51120**	9.71044	**.51338**	9.71228	**.51556**	9.71411	**.51774**	9.71594	**.51992**	52
9	.70862	**.51123**	.71047	**.51342**	.71231	**.51560**	.71414	**.51778**	.71597	**.51996**	51
10	.70865	**.51127**	.71050	**.51345**	.71234	**.51563**	.71417	**.51781**	.71600	**.51999**	50
11	.70868	**.51131**	.71053	**.51349**	.71237	**.51567**	.71420	**.51785**	.71603	**.52003**	49
+ 3′	9.70871	**.51134**	9.71056	**.51352**	9.71240	**.51571**	9.71423	**.51789**	9.71606	**.52007**	48
13	.70874	**.51138**	.71059	**.51356**	.71243	**.51574**	.71426	**.51792**	.71609	**.52010**	47
14	.70877	**.51142**	.71062	**.51360**	.71246	**.51578**	.71430	**.51796**	.71612	**.52014**	46
15	.70881	**.51145**	.71065	**.51363**	.71249	**.51581**	.71433	**.51799**	.71615	**.52018**	45
+ 4′	9.70884	**.51149**	9.71068	**.51367**	9.71252	**.51585**	9.71436	**.51803**	9.71618	**.52021**	44
17	.70887	**.51153**	.71072	**.51371**	.71255	**.51589**	.71439	**.51807**	.71621	**.52025**	43
18	.70890	**.51156**	.71075	**.51374**	.71259	**.51592**	.71442	**.51810**	.71624	**.52028**	42
19	.70893	**.51160**	.71078	**.51378**	.71262	**.51596**	.71445	**.51814**	.71627	**.52032**	41
+ 5′	9.70896	**.51163**	9.71081	**.51382**	9.71265	**.51600**	9.71448	**.51818**	9.71630	**.52036**	40
21	.70899	**.51167**	.71084	**.51385**	.71268	**.51603**	.71451	**.51821**	.71633	**.52039**	39
22	.70902	**.51171**	.71087	**.51389**	.71271	**.51607**	.71454	**.51825**	.71636	**.52043**	38
23	.70905	**.51174**	.71090	**.51392**	.71274	**.51611**	.71457	**.51829**	.71639	**.52047**	37
+ 6′	9.70908	**.51178**	9.71093	**.51396**	9.71277	**.51614**	9.71460	**.51832**	9.71642	**.52050**	36
25	.70911	**.51182**	.71096	**.51400**	.71280	**.51618**	.71463	**.51836**	.71645	**.52054**	35
26	.70914	**.51185**	.71099	**.51403**	.71283	**.51621**	.71466	**.51839**	.71648	**.52057**	34
27	.70918	**.51189**	.71102	**.51407**	.71286	**.51625**	.71469	**.51843**	.71651	**.52061**	33
+ 7′	9.70921	**.51193**	9.71105	**.51411**	9.71289	**.51629**	9.71472	**.51847**	9.71654	**.52065**	32
29	.70924	**.51196**	.71108	**.51414**	.71292	**.51632**	.71475	**.51850**	.71657	**.52068**	31
30	.70927	**.51200**	.71111	**.51418**	.71295	**.51636**	.71478	**.51854**	.71660	**.52072**	30
31	.70930	**.51203**	.71114	**.51422**	.71298	**.51640**	.71481	**.51858**	.71663	**.52076**	29
+ 8′	9.70933	**.51207**	9.71118	**.51425**	9.71301	**.51643**	9.71484	**.51861**	9.71666	**.52079**	28
33	.70936	**.51211**	.71121	**.51429**	.71304	**.51647**	.71487	**.51865**	.71670	**.52083**	27
34	.70939	**.51214**	.71124	**.51432**	.71307	**.51650**	.71490	**.51869**	.71673	**.52087**	26
35	.70942	**.51218**	.71127	**.51436**	.71311	**.51654**	.71493	**.51872**	.71676	**.52090**	25
+ 9′	9.70945	**.51222**	9.71130	**.51440**	9.71314	**.51658**	9.71496	**.51876**	9.71679	**.52094**	24
37	.70948	**.51225**	.71133	**.51443**	.71317	**.51661**	.71500	**.51879**	.71682	**.52097**	23
38	.70951	**.51229**	.71136	**.51447**	.71320	**.51665**	.71503	**.51883**	.71685	**.52101**	22
39	.70955	**.51233**	.71139	**.51451**	.71323	**.51669**	.71506	**.51887**	.71688	**.52105**	21
+ 10′	9.70958	**.51236**	9.71142	**.51454**	9.71326	**.51672**	9.71509	**.51890**	9.71691	**.52108**	20
41	.70961	**.51240**	.71145	**.51458**	.71329	**.51676**	.71512	**.51894**	.71694	**.52112**	19
42	.70964	**.51243**	.71148	**.51462**	.71332	**.51680**	.71515	**.51898**	.71697	**.52116**	18
43	.70967	**.51247**	.71151	**.51465**	.71335	**.51683**	.71518	**.51901**	.71700	**.52119**	17
+ 11′	9.70970	**.51251**	9.71154	**.51469**	9.71338	**.51687**	9.71521	**.51905**	9.71703	**.52123**	16
45	.70973	**.51254**	.71157	**.51472**	.71341	**.51690**	.71524	**.51908**	.71706	**.52126**	15
46	.70976	**.51258**	.71161	**.51476**	.71344	**.51694**	.71527	**.51912**	.71709	**.52130**	14
47	.70979	**.51262**	.71164	**.51480**	.71347	**.51698**	.71530	**.51916**	.71712	**.52134**	13
+ 12′	9.70982	**.51265**	9.71167	**.51483**	9.71350	**.51701**	9.71533	**.51919**	9.71715	**.52137**	12
49	.70985	**.51269**	.71170	**.51487**	.71353	**.51705**	.71536	**.51923**	.71718	**.52141**	11
50	.70988	**.51273**	.71173	**.51491**	.71356	**.51709**	.71539	**.51927**	.71721	**.52145**	10
51	.70992	**.51276**	.71176	**.51494**	.71359	**.51712**	.71542	**.51930**	.71724	**.52148**	9
+ 13′	9.70995	**.51280**	9.71179	**.51498**	9.71362	**.51716**	9.71545	**.51934**	9.71727	**.52152**	8
53	.70998	**.51283**	.71182	**.51501**	.71365	**.51720**	.71548	**.51938**	.71730	**.52156**	7
54	.71001	**.51287**	.71185	**.51505**	.71369	**.51723**	.71551	**.51941**	.71733	**.52159**	6
55	.71004	**.51291**	.71188	**.51508**	.71372	**.51727**	.71554	**.51945**	.71736	**.52163**	5
+ 14′	9.71007	**.51294**	9.71191	**.51512**	9.71375	**.51730**	9.71557	**.51948**	9.71739	**.52166**	4
57	.71010	**.51298**	.71194	**.51516**	.71378	**.51734**	.71560	**.51952**	.71742	**.52170**	3
58	.71013	**.51302**	.71197	**.51520**	.71381	**.51738**	.71563	**.51956**	.71745	**.52174**	2
59	.71016	**.51305**	.71200	**.51523**	.71384	**.51741**	.71566	**.51959**	.71748	**.52177**	1
+ 15′	9.71019	**.51309**	9.71203	**.51527**	9.71387	**.51745**	9.71569	**.51963**	9.71751	**.52181**	0
	$17^h\ 54^m$		$17^h\ 53^m$		$17^h\ 52^m$		$17^h\ 51^m$		$17^h\ 50^m$		

TABLE 45.

Haversines.

s	$6^h\,10^m$ **92° 30′**		$6^h\,11^m$ **92° 45′**		$6^h\,12^m$ **93° 0′**		$6^h\,13^m$ **93° 15′**		$6^h\,14^m$ **93° 30′**		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.71751	**.52181**	9.71932	**.52399**	9.72112	**.52617**	9.72292	**.52835**	9.72471	**.53052**	60
1	.71754	**.52185**	.71935	**.52403**	.72115	**.52620**	.72295	**.52838**	.72474	**.53056**	59
2	.71757	**.52188**	.71938	**.52406**	.72118	**.52624**	.72298	**.52842**	.72476	**.53060**	58
3	.71760	**.52192**	.71941	**.52410**	.72121	**.52628**	.72301	**.52846**	.72479	**.53063**	57
+ **1′**	9.71763	**.52196**	9.71944	**.52413**	9.72124	**.52631**	9.72304	**.52849**	9.72482	**.53067**	56
5	.71766	**.52199**	.71947	**.52417**	.72127	**.52635**	.72307	**.52853**	.72485	**.53071**	55
6	.71769	**.52203**	.71950	**.52421**	.72130	**.52639**	.72310	**.52856**	.72488	**.53074**	54
7	.71772	**.52206**	.71953	**.52424**	.72133	**.52642**	.72313	**.52860**	.72491	**.53078**	53
+ **2′**	9.71775	**.52210**	9.71956	**.52428**	9.72136	**.52646**	9.72316	**.52864**	9.72494	**.53081**	52
9	.71778	**.52214**	.71959	**.52432**	.72139	**.52649**	.72319	**.52867**	.72497	**.53085**	51
10	.71781	**.52217**	.71962	**.52435**	.72142	**.52653**	.72322	**.52871**	.72500	**.53089**	50
11	.71784	**.52221**	.71965	**.52439**	.72145	**.52657**	.72325	**.52875**	.72503	**.53092**	49
+ **3′**	9.71787	**.52225**	9.71968	**.52442**	9.72148	**.52660**	9.72328	**.52878**	9.72506	**.53096**	48
13	.71791	**.52228**	.71971	**.52446**	.72151	**.52664**	.72331	**.52882**	.72509	**.53100**	47
14	.71794	**.52232**	.71974	**.52450**	.72154	**.52668**	.72334	**.52885**	.72512	**.53103**	46
15	.71797	**.52235**	.71977	**.52453**	.72157	**.52671**	.72337	**.52889**	.72515	**.53107**	45
+ **4′**	9.71800	**.52239**	9.71980	**.52457**	9.72160	**.52675**	9.72340	**.52893**	9.72518	**.53110**	44
17	.71803	**.52243**	.71983	**.52461**	.72163	**.52679**	.72343	**.52896**	.72521	**.53114**	43
18	.71806	**.52246**	.71986	**.52464**	.72166	**.52682**	.72346	**.52900**	.72524	**.53118**	42
19	.71809	**.52250**	.71989	**.52468**	.72169	**.52686**	.72349	**.52904**	.72527	**.53121**	41
+ **5′**	9.71812	**.52254**	9.71992	**.52472**	9.72172	**.52689**	9.72352	**.52907**	9.72530	**.53125**	40
21	.71815	**.52257**	.71995	**.52475**	.72175	**.52693**	.72354	**.52911**	.72533	**.53129**	39
22	.71818	**.52261**	.71998	**.52479**	.72178	**.52697**	.72357	**.52915**	.72536	**.53132**	38
23	.71821	**.52264**	.72001	**.52482**	.72181	**.52700**	.72360	**.52918**	.72539	**.53136**	37
+ **6′**	9.71824	**.52268**	9.72004	**.52486**	9.72184	**.52704**	9.72363	**.52922**	9.72542	**.53140**	36
25	.71827	**.52272**	.72007	**.52490**	.72187	**.52708**	.72366	**.52925**	.72545	**.53143**	35
26	.71830	**.52275**	.72010	**.52493**	.72190	**.52711**	.72369	**.52929**	.72548	**.53147**	34
27	.71833	**.52279**	.72013	**.52497**	.72193	**.52715**	.72372	**.52933**	.72551	**.53150**	33
+ **7′**	9.71836	**.52283**	9.72016	**.52501**	9.72196	**.52718**	9.72375	**.52936**	9.72554	**.53154**	32
29	.71839	**.52286**	.72019	**.52504**	.72199	**.52722**	.72378	**.52940**	.72557	**.53158**	31
30	.71842	**.52290**	.72022	**.52508**	.72202	**.52726**	.72381	**.52944**	.72560	**.53161**	30
31	.71845	**.52294**	.72025	**.52511**	.72205	**.52729**	.72384	**.52947**	.72563	**.53165**	29
+ **8′**	9.71848	**.52297**	9.72028	**.52515**	9.72208	**.52733**	9.72387	**.52951**	9.72565	**.53169**	28
33	.71851	**.52301**	.72031	**.52519**	.72211	**.52737**	.72390	**.52954**	.72568	**.53172**	27
34	.71854	**.52304**	.72034	**.52522**	.72214	**.52740**	.72393	**.52958**	.72571	**.53176**	26
35	.71857	**.52308**	.72037	**.52526**	.72217	**.52744**	.72396	**.52962**	.72574	**.53179**	25
+ **9′**	9.71860	**.52312**	9.72040	**.52530**	9.72220	**.52748**	9.72399	**.52965**	9.72577	**.53183**	24
37	.71863	**.52315**	.72043	**.52533**	.72223	**.52751**	.72402	**.52969**	.72580	**.53187**	23
38	.71866	**.52319**	.72046	**.52537**	.72226	**.52755**	.72405	**.52973**	.72583	**.53190**	22
39	.71869	**.52323**	.72049	**.52541**	.72229	**.52758**	.72408	**.52976**	.72586	**.53194**	21
+ **10′**	9.71872	**.52326**	9.72052	**.52544**	9.72232	**.52762**	9.72411	**.52980**	9.72589	**.53198**	20
41	.71875	**.52330**	.72055	**.52548**	.72235	**.52766**	.72414	**.52983**	.72592	**.53201**	19
42	.71878	**.52334**	.72058	**.52551**	.72238	**.52769**	.72417	**.52987**	.72595	**.53205**	18
43	.71881	**.52337**	.72061	**.52555**	.72241	**.52773**	.72420	**.52991**	.72598	**.53208**	17
+ **11′**	9.71884	**.52341**	9.72064	**.52559**	9.72244	**.52776**	9.72423	**.52994**	9.72601	**.53212**	16
45	.71887	**.52344**	.72067	**.52562**	.72247	**.52780**	.72426	**.52998**	.72604	**.53216**	15
46	.71890	**.52348**	.72070	**.52566**	.72250	**.52784**	.72429	**.53002**	.72607	**.53219**	14
47	.71893	**.52352**	.72073	**.52570**	.72253	**.52787**	.72432	**.53005**	.72610	**.53223**	13
+ **12′**	9.71896	**.52355**	9.72076	**.52573**	9.72256	**.52791**	9.72435	**.53009**	9.72613	**.53227**	12
49	.71899	**.52359**	.72079	**.52577**	.72259	**.52795**	.72438	**.53013**	.72616	**.53230**	11
50	.71902	**.52363**	.72082	**.52580**	.72262	**.52798**	.72441	**.53016**	.72619	**.53234**	10
51	.71905	**.52366**	.72085	**.52584**	.72265	**.52802**	.72444	**.53020**	.72622	**.53238**	9
+ **13′**	9.71908	**.52370**	9.72088	**.52588**	9.72268	**.52806**	9.72447	**.53023**	9.72625	**.53241**	8
53	.71911	**.52373**	.72091	**.52591**	.72271	**.52809**	.72450	**.53027**	.72628	**.53245**	7
54	.71914	**.52377**	.72094	**.52595**	.72274	**.52813**	.72453	**.53031**	.72631	**.53248**	6
55	.71917	**.52381**	.72097	**.52599**	.72277	**.52816**	.72456	**.53034**	.72634	**.53252**	5
+ **14′**	9.71920	**.52384**	9.72100	**.52602**	9.72280	**.52820**	9.72459	**.53038**	9.72637	**.55256**	4
57	.71923	**.52388**	.72103	**.52606**	.72283	**.52824**	.72462	**.53042**	.72640	**.53259**	3
58	.71926	**.52392**	.72106	**.52610**	.72286	**.52827**	.72465	**.53045**	.72642	**.53263**	2
59	.71929	**.52395**	.72119	**.52613**	.72289	**.52831**	.72468	**.53049**	.72645	**.53267**	1
+ **15′**	9.71932	**.52399**	9.72112	**.52617**	9.72292	**.52835**	9.72471	**.53052**	9.72648	**.53270**	0
	$17^h\,49^m$		$17^h\,48^m$		$17^h\,47^m$		$17^h\,46^m$		$17^h\,45^m$		

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TABLE 45.

Haversines.

s	6h 15m 93° 45′		6h 16m 94° 0′		6h 17m 94° 15′		6h 18m 94° 30′		6h 19m 94° 45		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.72648	**.53270**	9.72825	**.53488**	9.73002	**.53705**	9.73177	**.53923**	9.73352	**.54140**	60
1	.72651	**.53274**	.72828	**.53491**	.73005	**.53709**	.73180	**.53927**	.73355	**.54144**	59
2	.72654	**.53277**	.72831	**.53495**	.73008	**.53713**	.73183	**.53930**	.73358	**.54148**	58
3	.72657	**.53281**	.72834	**.53499**	.73011	**.53716**	.73186	**.53934**	.73361	**.54151**	57
+ 1′	9.72660	**.53285**	9.72837	**.53502**	9.73014	**.53720**	9.73189	**.53937**	9.73364	**.54155**	56
5	.72663	**.53288**	.72840	**.53506**	.73016	**.53724**	.73192	**.53941**	.73367	**.54159**	55
6	.72666	**.53292**	.72843	**.53510**	.73019	**.53727**	.73195	**.53945**	.73370	**.54162**	54
7	.72669	**.53296**	.72846	**.53513**	.73022	**.53731**	.73198	**.53948**	.73373	**.54166**	53
+ 2′	9.72672	**.53299**	9.72849	**.53517**	9.73025	**.53734**	9.73201	**.53952**	9.73375	**.54169**	52
9	.72675	**.53303**	.72852	**.53520**	.73028	**.53738**	.73204	**.53956**	.73378	**.54173**	51
10	.72678	**.53306**	.72855	**.53524**	.73031	**.53742**	.73207	**.53959**	.73381	**.54177**	50
11	.72681	**.53310**	.72858	**.53528**	.73034	**.53745**	.73209	**.53963**	.73384	**.54180**	49
+ 3′	9.72684	**.53314**	9.72861	**.53531**	9.73037	**.53749**	9.73212	**.53966**	9.73387	**.54184**	48
13	.72687	**.53317**	.72864	**.53535**	.73040	**.53753**	.73215	**.53970**	.73390	**.54188**	47
14	.72690	**.53321**	.72867	**.53539**	.73043	**.53756**	.73218	**.53974**	.73393	**.54191**	46
15	.72693	**.53325**	.72870	**.53542**	.73046	**.53760**	.73221	**.53977**	.73396	**.54195**	45
+ 4′	9.72696	**.53328**	9.72873	**.53546**	9.73049	**.53763**	9.73224	**.53981**	9.73399	**.54198**	44
17	.72699	**.53332**	.72876	**.53549**	.73052	**.53767**	.73227	**.53985**	.73402	**.54202**	43
18	.72702	**.53335**	.72878	**.53553**	.73055	**.53771**	.73230	**.53988**	.73404	**.54206**	42
19	.72705	**.53339**	.72881	**.53557**	.73057	**.53774**	.73233	**.53992**	.73407	**.54209**	41
+ 5′	9.72708	**.53343**	9.72884	**.53560**	9.73060	**.53778**	9.73236	**.53995**	9.73410	**.54213**	40
21	.72710	**.53346**	.72887	**.53564**	.73063	**.53782**	.73239	**.53999**	.73413	**.54217**	39
22	.72713	**.53350**	.72890	**.53568**	.73066	**.53785**	.73242	**.54003**	.73416	**.54220**	38
23	.72716	**.53354**	.72893	**.53571**	.73069	**.53789**	.73244	**.54006**	.73419	**.54224**	37
+ 6′	9.72719	**.53357**	9.72896	**.53575**	9.73072	**.53792**	9.73247	**.54010**	9.73422	**.54227**	36
25	.72722	**.53361**	.72899	**.53579**	.73075	**.53796**	.73250	**.54014**	.73425	**.54231**	35
26	.72725	**.53364**	.72902	**.53582**	.75078	**.53800**	.73253	**.54017**	.73428	**.54235**	34
27	.72728	**.53368**	.72905	**.53586**	.73081	**.53803**	.73256	**.54021**	.73431	**.54238**	33
+ 7′	9.72731	**.53372**	9.72908	**.53589**	9.73084	**.53807**	9.73259	**.54024**	9.73433	**.54242**	32
29	.72734	**.53375**	.72911	**.53593**	.73087	**.53811**	.73262	**.54028**	.73436	**.54245**	31
30	.72737	**.53379**	.72914	**.53597**	.73090	**.53814**	.73265	**.54032**	.73439	**.54249**	30
31	.72740	**.53383**	.72917	**.53600**	.73093	**.53818**	.73268	**.54035**	.73442	**.54253**	29
+ 8′	9.72743	**.53386**	9.72920	**.53604**	9.73096	**.53821**	9.73271	**.54039**	9.73445	**.54256**	28
33	.72746	**.53390**	.72923	**.53608**	.73098	**.53825**	.73274	**.54043**	.73448	**.54260**	27
34	.72749	**.53394**	.72926	**.53611**	.73101	**.53829**	.73277	**.54046**	.73451	**.54264**	26
35	.72752	**.53397**	.72928	**.53615**	.73104	**.53832**	.73280	**.54050**	.73454	**.54267**	25
+ 9′	9.72755	**.53401**	9.72931	**.53618**	9.73107	**.53836**	9.73282	**.54053**	9.73457	**.54271**	24
37	.72758	**.53404**	.72934	**.53622**	.73110	**.53840**	.73285	**.54057**	.73460	**.54274**	23
38	.72761	**.53408**	.72937	**.53626**	.73113	**.53843**	.73288	**.54061**	.73462	**.54278**	22
39	.72764	**.53412**	.72940	**.53629**	.73116	**.53847**	.73291	**.54064**	.73465	**.54282**	21
+ 10′	9.72767	**.53415**	9.72943	**.53633**	9.73119	**.53850**	9.73294	**.54068**	9.73468	**.54285**	20
41	.72770	**.53419**	.72946	**.53637**	.73122	**.53854**	.73297	**.54072**	.73471	**.54289**	19
42	.72772	**.53423**	.72949	**.53640**	.73125	**.53858**	.73300	**.54075**	.73474	**.54293**	18
43	.72775	**.53426**	.72952	**.53644**	.73128	**.53861**	.73303	**.54079**	.73477	**.54296**	17
+ 11′	9.72778	**.53430**	9.72955	**.53647**	9.73131	**.53865**	9.73306	**.54082**	9.73480	**.54300**	16
45	.72781	**.53433**	.72958	**.53651**	.73134	**.53869**	.73309	**.54086**	.73483	**.54303**	15
46	.72784	**.53437**	.72961	**.53655**	.73136	**.53872**	.73311	**.54090**	.73486	**.54307**	14
47	.72787	**.53441**	.72964	**.53658**	.73139	**.53876**	.73314	**.54093**	.73489	**.54311**	13
+ 12′	9.72790	**.53444**	9.72967	**.53662**	9.73142	**.53879**	9.73317	**.54097**	9.73491	**.54314**	12
49	.72793	**.53448**	.72970	**.53666**	.73145	**.53883**	.73320	**.54101**	.73494	**.54318**	11
50	.72796	**.53452**	.72972	**.53669**	.73148	**.53887**	.73323	**.54104**	.73497	**.54322**	10
51	.72799	**.53455**	.72975	**.53673**	.73151	**.53890**	.73326	**.54108**	.73500	**.54325**	9
+ 13′	9.72802	**.53459**	9.72978	**.53676**	9.73154	**.53894**	9.73329	**.54111**	9.73503	**.54329**	8
53	.72805	**.53462**	.72981	**.53680**	.73157	**.53898**	.73332	**.54115**	.73506	**.54332**	7
54	.72808	**.53466**	.72984	**.53684**	.73160	**.53901**	.73335	**.54119**	.73509	**.54336**	6
55	.72811	**.53470**	.72987	**.53687**	.73163	**.53905**	.73338	**.54122**	.73512	**.54340**	5
+ 14′	9.72814	**.53473**	9.72990	**.53691**	9.73166	**.53908**	9.73341	**.54126**	9.73515	**.54343**	4
57	.72817	**.53477**	.72993	**.53695**	.73169	**.53912**	.73343	**.54130**	.73517	**.54347**	3
58	.72820	**.53481**	.72996	**.53698**	.73172	**.53916**	.73346	**.54133**	.73520	**.54351**	2
59	.72823	**.53484**	.72999	**.53702**	.73174	**.53919**	.73349	**.54137**	.73523	**.54354**	1
+ 15′	9.72825	**.53488**	9.73002	**.53705**	9.73177	**.53923**	9.73352	**.54140**	9.73526	**.54358**	0
	17h 44m		17h 43m		17h 42m		17h 41m		17h 40m		

TABLE 45.

Haversines.

s	$6^h\ 20^m$ 95° 0′		$6^h\ 21^m$ 95° 15′		$6^h\ 22^m$ 95° 30′		$6^h\ 23^m$ 95° 45′		$6^h\ 24^m$ 96° 0′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.73526	.54358	9.73699	.54575	9.73872	.54792	9.74044	.55009	9.74215	.55226	60
1	.73529	.54361	.73702	.54579	.73875	.54796	.74047	.55013	.74218	.55230	59
2	.73532	.54365	.73705	.54582	.73878	.54800	.74049	.55017	.74220	.55234	58
3	.73535	.54369	.73708	.54586	.73881	.54803	.74052	.55020	.74223	.55237	57
+ 1′	9.73538	.54372	9.73711	.54590	9.73883	.54807	9.74055	.55024	9.74226	.55241	56
5	.73541	.54376	.73714	.54593	.73886	.54810	.74058	.55028	.74229	.55245	55
6	.73544	.54380	.73717	.54597	.73889	.54814	.74061	.55031	.74232	.55248	54
7	.73546	.54383	.73720	.54600	.73892	.54818	.74064	.55035	.74235	.55252	53
+ 2′	9.73549	.54387	9.73722	.54604	9.73895	.54821	9.74067	.55038	9.74237	.55255	52
9	.73552	.54390	.73725	.54608	.73898	.54825	.74069	.55042	.74240	.55259	51
10	.73555	.54394	.73728	.54611	.73901	.54828	.74072	.55046	.74243	.55263	50
11	.73558	.54398	.73731	.54615	.73903	.54832	.74075	.55049	.74246	.55266	49
+ 3′	9.73561	.54401	9.73734	.54619	9.73906	.54836	9.74078	.55053	9.74249	.55270	48
13	.73564	.54405	.73737	.54622	.73909	.54839	.74081	.55056	.74252	.55273	47
14	.73567	.54409	.73740	.54626	.73912	.54843	.74084	.55060	.74254	.55277	46
15	.73570	.54412	.73743	.54629	.73915	.54847	.74087	.55064	.74257	.55281	45
+ 4′	9.73572	.54416	9.73746	.54633	9.73918	.54850	9.74089	.55067	9.74260	.55284	44
17	.73575	.54419	.73748	.54637	.73921	.54854	.74092	.55071	.74263	.55288	43
18	.73578	.54423	.73751	.54640	.73924	.54857	.74095	.55075	.74266	.55292	42
19	.73581	.54427	.73754	.54644	.73926	.54861	.74098	.55078	.74269	.55295	41
+ 5′	9.73584	.54430	9.73757	.54647	9.73929	.54865	9.74101	.55082	9.74272	.55299	40
21	.73587	.54434	.73760	.54651	.73932	.54868	.74104	.55085	.74274	.55302	39
22	.73590	.54437	.73763	.54655	.73935	.54872	.74106	.55089	.74277	.55306	38
23	.73593	.54441	.73766	.54658	.73938	.54876	.74109	.55093	.74280	.55310	37
+ 6′	9.73596	.54445	9.73769	.54662	9.73941	.54879	9.74112	.55096	9.74283	.55313	36
25	.73598	.54448	.73771	.54666	.73944	.54883	.74115	.55100	.74286	.55317	35
26	.73601	.54452	.73774	.54669	.73946	.54886	.74118	.55103	.74289	.55320	34
27	.73604	.54456	.73777	.54673	.73949	.54890	.74121	.55107	.74291	.55324	33
+ 7′	9.73607	.54459	9.73780	.54676	9.73952	.54894	9.74124	.55111	9.74294	.55328	32
29	.73610	.54463	.73783	.54680	.73955	.54897	.74126	.55114	.74297	.55331	31
30	.73613	.54466	.73786	.54684	.73958	.54901	.74129	.55118	.74300	.55335	30
31	.73616	.54470	.73789	.54687	.73961	.54904	.74132	.55122	.74303	.55339	29
+ 8′	9.73619	.54474	9.73792	.54691	9.73964	.54908	9.74135	.55125	9.74306	.55342	28
33	.73622	.54477	.73794	.54695	.73967	.54912	.74138	.55129	.74308	.55346	27
34	.73624	.54481	.73797	.54698	.73969	.54915	.74141	.55132	.74311	.55349	26
35	.73627	.54485	.73800	.54702	.73972	.54919	.74144	.55136	.74314	.55353	25
+ 9′	9.73630	.54488	9.73803	.54705	9.73975	.54923	9.74146	.55140	9.74317	.55357	24
37	.73633	.54492	.73806	.54709	.73978	.54926	.74149	.55143	.74320	.55360	23
38	.73636	.54495	.73809	.54713	.73981	.54930	.74152	.55147	.74323	.55364	22
39	.73639	.54499	.73812	.54716	.73984	.54933	.74155	.55150	.74325	.55367	21
+ 10′	9.73642	.54503	9.73815	.54720	9.73987	.54937	9.74158	.55154	9.74328	.55371	20
41	.73645	.54506	.73817	.54724	.73989	.54941	.74161	.55158	.74331	.55375	19
42	.73648	.54510	.73820	.54727	.73992	.54944	.74163	.55161	.74334	.55378	18
43	.73650	.54514	.73823	.54731	.73995	.54948	.74166	.55165	.74337	.55382	17
+ 11′	9.73653	.54517	9.73826	.54734	9.73998	.54952	9.74169	.55169	9.74340	.55386	16
45	.73656	.54521	.73829	.54738	.74001	.54955	.74172	.55172	.74342	.55389	15
46	.73659	.54524	.73832	.54742	.74004	.54959	.74175	.55176	.74345	.55393	14
47	.73662	.54528	.73835	.54745	.74007	.54963	.74178	.55179	.74348	.55396	13
+ 12′	9.73665	.54532	9.73838	.54749	9.74009	.54966	9.74181	.55183	9.74351	.55400	12
49	.73668	.54535	.73840	.54752	.74012	.54970	.74183	.55187	.74354	.55404	11
50	.73671	.54539	.73843	.54756	.74015	.54973	.74186	.55190	.74357	.55407	10
51	.73674	.54542	.73846	.54760	.74018	.54977	.74189	.55194	.74359	.55411	9
+ 13′	9.73676	.54546	9.73849	.54763	9.74021	.54980	9.74192	.55197	9.74362	.55414	8
53	.73679	.54550	.73852	.54767	.74024	.54984	.74195	.55201	.74365	.55418	7
54	.73682	.54553	.73855	.54771	.74027	.54988	.74198	.55205	.74368	.55422	6
55	.73685	.54557	.73858	.54774	.74029	.54991	.74200	.55208	.74371	.55425	5
+ 14′	9.73688	.54561	9.73860	.54778	9.74032	.54995	9.74203	.55212	9.74374	.55429	4
57	.73691	.54564	.73863	.54781	.74035	.54999	.74206	.55216	.74376	.55433	3
58	.73694	.54568	.73866	.54785	.74038	.55002	.74209	.55219	.74379	.55436	2
59	.73697	.54571	.73869	.54789	.74041	.55006	.74212	.55223	.74382	.55440	1
+ 15′	9.73699	.54575	9.73872	.54792	9.74044	.55009	9.74215	.55226	9.74385	.55443	0
	$17^h\ 39^m$		$17^h\ 38^m$		$17^h\ 37^m$		$17^h\ 36^m$		$17^h\ 35^m$		

TABLE 45.

Haversines.

s	$6^h\ 25^m$ 96° 15′		$6^h\ 26^m$ 96° 30′		$6^h\ 27^m$ 96° 45′		$6^h\ 28^m$ 97° 0′		$6^h\ 29^m$ 97° 15′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.74385	.55443	9.74554	.55660	9.74723	.55877	9.74891	.56093	9.75059	.56310	60
1	.74388	.55447	.74557	.55664	.74726	.55880	.74894	.56097	.75061	.56314	59
2	.74391	.55451	.74560	.55667	.74729	.55884	.74897	.56101	.75064	.56317	58
3	.74393	.55454	.74563	.55671	.74732	.55888	.74900	.56104	.75067	.56321	57
+ 1′	9.74396	.55458	9.74566	.55675	9.74734	.55891	9.74902	.56108	9.75070	.56324	56
5	.74399	.55461	.74569	.55678	.74737	.55895	.74905	.56112	.75072	.56328	55
6	.74402	.55465	.74571	.55682	.74740	.55899	.74908	.56115	.75075	.56332	54
7	.74405	.55469	.74574	.55685	.74743	.55902	.74911	.56119	.75078	.56335	53
+ 2′	9.74408	.55472	9.74577	.55689	9.74746	.55906	9.74914	.56122	9.75081	.56339	52
9	.74410	.55476	.74580	.55693	.74748	.55909	.74916	.56126	.75084	.56342	51
10	.74413	.55479	.74583	.55696	.74751	.55913	.74919	.56130	.75086	.56346	50
11	.74416	.55483	.74585	.55700	.74754	.55917	.74922	.56133	.75089	.56350	49
+ 3′	9.74419	.55487	9.74588	.55704	9.74757	.55920	9.74925	.56137	9.75092	.56353	48
13	.74422	.55490	.74591	.55707	.74760	.55924	.74928	.56140	.75095	.56357	47
14	.74425	.55494	.74594	.55711	.74762	.55927	.74930	.56144	.75097	.56360	46
15	.74427	.55498	.74597	.55714	.74765	.55931	.74933	.56147	.75100	.56364	45
+ 4′	9.74430	.55501	9.74600	.55718	9.74768	.55935	9.74936	.56151	9.75103	.56368	44
17	.74433	.55505	.74602	.55722	.74771	.55938	.74939	.56155	.75106	.56371	43
18	.74436	.55508	.74605	.55725	.74774	.55942	.74941	.56158	.75109	.56375	42
19	.74439	.55512	.74608	.55729	.74776	.55945	.74944	.56162	.75111	.56378	41
+ 5′	9.74442	.55516	9.74611	.55732	9.74779	.55949	9.74947	.56166	9.75114	.56382	40
21	.74444	.55519	.74614	.55736	.74782	.55953	.74950	.56169	.75117	.56386	39
22	.74447	.55523	.74616	.55740	.74785	.55956	.74953	.56173	.75120	.56389	38
23	.74450	.55526	.74619	.55743	.74788	.55960	.74955	.56176	.75122	.56393	37
+ 6′	9.74453	.55530	9.74622	.55747	9.74791	.55964	9.74958	.56180	9.75125	.56397	36
25	.74456	.55534	.74625	.55750	.74793	.55967	.74961	.56184	.75128	.56400	35
26	.74458	.55537	.74628	.55754	.74796	.55971	.74964	.56187	.75131	.56404	34
27	.74461	.55541	.74630	.55758	.74799	.55974	.74967	.56191	.75134	.56407	33
+ 7′	9.74464	.55545	9.74633	.55761	9.74802	.55978	9.74969	.56195	9.75136	.56411	32
29	.74467	.55548	.74636	.55765	.74805	.55982	.74972	.56198	.75139	.56415	31
30	.74470	.55552	.74639	.55769	.74807	.55985	.74975	.56202	.75142	.56418	30
31	.74473	.55555	.74642	.55772	.74810	.55989	.74978	.56205	.75145	.56422	29
+ 8′	9.74475	.55559	9.74645	.55776	9.74813	.55992	9.74981	.56209	9.75147	.56425	28
33	.74478	.55563	.74647	.55779	.74816	.55996	.74983	.56213	.75150	.56429	27
34	.74481	.55566	.74650	.55783	.74819	.56000	.74986	.56216	.75153	.56433	26
35	.74484	.55570	.74653	.55787	.74821	.56003	.74989	.56220	.75156	.56436	25
+ 9′	9.74487	.55573	9.74656	.55790	9.74824	.56007	9.74992	.56223	9.75159	.56440	24
37	.74490	.55577	.74659	.55794	.74827	.56010	.74994	.56227	.75161	.56443	23
38	.74492	.55581	.74661	.55797	.74830	.56014	.74997	.56231	.75164	.56447	22
39	.74495	.55584	.74664	.55801	.74833	.56018	.75000	.56234	.75167	.56451	21
+ 10′	9.74498	.55588	9.74667	.55805	9.74835	.56021	9.75003	.56238	9.75170	.56454	20
41	.74501	.55592	.74670	.55808	.74838	.56025	.75006	.56241	.75172	.56458	19
42	.74504	.55595	.74673	.55812	.74841	.56029	.75008	.56245	.75175	.56461	18
43	.74506	.55599	.74675	.55815	.74844	.56032	.75011	.56249	.75178	.56465	17
+ 11′	9.74509	.55602	9.74678	.55819	9.74846	.56036	9.75014	.56252	9.75181	.56469	16
45	.74512	.55606	.74681	.55823	.74849	.56039	.75017	.56256	.75183	.56472	15
46	.74515	.55610	.74684	.55826	.74852	.56043	.75020	.56259	.75186	.56476	14
47	.74518	.55613	.74687	.55830	.74855	.56047	.75022	.56263	.75189	.56479	13
+ 12′	9.74521	.55617	9.74690	.55834	9.74858	.56050	9.75025	.56267	9.75192	.56483	12
49	.74523	.55620	.74692	.55837	.74860	.56054	.75028	.56270	.75195	.56487	11
50	.74526	.55624	.74695	.55841	.74863	.56057	.75031	.56274	.75197	.56490	10
51	.74529	.55628	.74698	.55844	.74866	.56061	.75033	.56277	.75200	.56494	9
+ 13′	9.74532	.55631	9.74701	.55848	9.74869	.56065	9.75036	.56281	9.75203	.56497	8
53	.74535	.55635	.74704	.55852	.74872	.56068	.75039	.56285	.75206	.56501	7
54	.74538	.55638	.74706	.55855	.74874	.56072	.75042	.56288	.75208	.56505	6
55	.74540	.55642	.74709	.55859	.74877	.56075	.75045	.56292	.75211	.56508	5
+ 14′	9.74543	.55646	9.74712	.55862	9.74880	.56079	9.75047	.56296	9.75214	.56512	4
57	.74546	.55649	.74715	.55866	.74883	.56083	.75050	.56299	.75217	.56516	3
58	.74549	.55653	.74718	.55870	.74886	.56086	.75053	.56303	.75220	.56519	2
59	.74552	.55657	.74720	.55873	.74888	.56090	.75056	.56306	.75222	.56523	1
+ 15′	9.74554	.55660	9.74723	.55877	9.74891	.56093	9.75059	.56310	9.75225	.56526	0
	$17^h\ 34^m$		$17^h\ 33^m$		$17^h\ 32^m$		$17^h\ 31^m$		$17^h\ 30^m$		

TABLE 45.

Haversines.

	$6^h\,30^m$ 97° 30′		$6^h\,31^m$ 97° 45′		$6^h\,32^m$ 98° 0′		$6^h\,33^m$ 98° 15′		$6^h\,34^m$ 98° 30′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.75225	**.56526**	9.75391	**.56743**	9.75556	**.56959**	9.75720	**.57175**	9.75884	**.57390**	60
1	.75228	**.56530**	.75394	**.56746**	.75559	**.56962**	.75723	**.57178**	.75887	**.57394**	59
2	.75231	**.56534**	.75396	**.56750**	.75561	**.56966**	.75726	**.57182**	.75889	**.57398**	58
3	.75233	**.56537**	.75399	**.56753**	.75564	**.56969**	.75729	**.57185**	.75892	**.57401**	57
+ 1′	9.75236	**.56541**	9.75402	**.56757**	9.75567	**.56973**	9.75731	**.57189**	9.75895	**.57405**	56
5	.75239	**.56544**	.75405	**.56761**	.75570	**.56977**	.75734	**.57193**	.75898	**.57408**	55
6	.75242	**.56548**	.75407	**.56764**	.75572	**.56980**	.75737	**.57196**	.75900	**.57412**	54
7	.75244	**.56552**	.75410	**.56768**	.75575	**.56984**	.75739	**.57200**	.75903	**.57416**	53
+ 2′	9.75247	**.56555**	9.75413	**.56771**	9.75578	**.56987**	9.75742	**.57203**	9.75906	**.57419**	52
9	.75250	**.56559**	.75416	**.56775**	.75581	**.56991**	.75745	**.57207**	.75908	**.57423**	51
10	.75253	**.56562**	.75418	**.56779**	.75583	**.56994**	.75748	**.57211**	.75911	**.57426**	50
11	.75256	**.56566**	.75421	**.56782**	.75586	**.56998**	.75750	**.57214**	.75914	**.57430**	49
+ 3′	9.75258	**.56570**	9.75424	**.56786**	9.75589	**.57002**	9.75753	**.57218**	9.75917	**.57434**	48
13	.75261	**.56573**	.75427	**.56789**	.75592	**.57005**	.75756	**.57221**	.75919	**.57437**	47
14	.75264	**.56577**	.75429	**.56793**	.75594	**.57009**	.75759	**.57225**	.75922	**.57441**	46
15	.75267	**.56580**	.75432	**.56797**	.75597	**.57012**	.75761	**.57229**	.75925	**.57444**	45
+ 4′	9.75269	**.56584**	9.75435	**.56800**	9.75600	**.57016**	9.75764	**.57232**	9.75927	**.57448**	44
17	.75272	**.56588**	.75438	**.56804**	.75603	**.57020**	.75767	**.57236**	.75930	**.57452**	43
18	.75275	**.56591**	.75440	**.56807**	.75605	**.57023**	.75770	**.57239**	.75933	**.57455**	42
19	.75278	**.56595**	.75443	**.56811**	.75608	**.57027**	.75772	**.57243**	.75936	**.57459**	41
+ 5′	9.75280	**.56598**	9.75446	**.56815**	9.75611	**.57031**	9.75775	**.57247**	9.75938	**.57462**	40
21	.75283	**.56602**	.75449	**.56818**	.75614	**.57034**	.75778	**.57250**	.75941	**.57466**	39
22	.75286	**.56606**	.75452	**.56822**	.75616	**.57038**	.75780	**.57254**	.75944	**.57470**	38
23	.75289	**.56609**	.75454	**.56825**	.75619	**.57041**	.75783	**.57257**	.75947	**.57473**	37
+ 6′	9.75291	**.56613**	9.75457	**.56829**	9.75622	**.57045**	9.75786	**.57261**	9.75949	**.57477**	36
25	.75294	**.56616**	.75460	**.56833**	.75625	**.57049**	.75789	**.57265**	.75952	**.57480**	36
26	.75297	**.56620**	.75463	**.56836**	.75627	**.57052**	.75791	**.57268**	.75955	**.57484**	34
27	.75300	**.56624**	.75465	**.56840**	.75630	**.57056**	.75794	**.57272**	.75957	**.57488**	33
+ 7′	9.75303	**.56627**	9.75468	**.56843**	9.75633	**.57059**	9.75797	**.57275**	9.75960	**.57491**	32
29	.75305	**.56631**	.75471	**.56847**	.75636	**.57063**	.75800	**.57279**	.75963	**.57495**	31
30	.75308	**.56634**	.75474	**.56851**	.75638	**.57067**	.75802	**.57283**	.75966	**.57498**	30
31	.75311	**.56638**	.75476	**.56854**	.75641	**.57070**	.75805	**.57286**	.75968	**.57502**	29
+ 8′	9.75314	**.56642**	9.75479	**.56858**	9.75644	**.57074**	9.75808	**.57290**	9.75971	**.57506**	28
33	.75316	**.56645**	.75482	**.56861**	.75646	**.57077**	.75810	**.57293**	.75974	**.57509**	27
34	.75319	**.56649**	.75485	**.56865**	.75649	**.57081**	.75813	**.57297**	.75976	**.57513**	26
35	.75322	**.56652**	.75487	**.56869**	.75652	**.57085**	.75816	**.57301**	.75979	**.57516**	25
+ 9′	9.75325	**.56656**	9.75490	**.56872**	9.75655	**.57088**	9.75819	**.57304**	9.75982	**.57520**	24
37	.75327	**.56660**	.75493	**.56876**	.75657	**.57092**	.75821	**.57308**	.75985	**.57524**	23
38	.75330	**.56663**	.75496	**.56879**	.75660	**.57095**	.75824	**.57311**	.75987	**.57527**	22
39	.75333	**.56667**	.75498	**.56883**	.75663	**.57099**	.75827	**.57315**	.75990	**.57531**	21
+ 10′	9.75336	**.56670**	9.75501	**.56887**	9.75666	**.57103**	9.75830	**.57318**	9.75993	**.57534**	20
41	.75338	**.56674**	.75504	**.56890**	.75668	**.57106**	.75832	**.57322**	.75995	**.57538**	19
42	.75341	**.56678**	.75507	**.56894**	.75671	**.57110**	.75835	**.57326**	.75998	**.57541**	18
43	.75344	**.56681**	.75509	**.56897**	.75674	**.57114**	.75838	**.57329**	.76001	**.57545**	17
+ 11′	9.75347	**.56685**	9.75512	**.56901**	9.75677	**.57117**	9.75840	**.57333**	9.76004	**.57549**	16
45	.75350	**.56689**	.75515	**.56905**	.75679	**.57121**	.75843	**.57337**	.76006	**.57552**	15
46	.75352	**.56692**	.75518	**.56908**	.75682	**.57124**	.75846	**.57340**	.76009	**.57556**	14
47	.75355	**.56696**	.75520	**.56912**	.75685	**.57128**	.75849	**.57344**	.76012	**.57559**	13
+ 12′	9.75358	**.56699**	9.75523	**.56915**	9.75688	**.57131**	9.75851	**.57347**	9.76014	**.57563**	12
49	.75361	**.56703**	.75526	**.56919**	.75690	**.57135**	.75854	**.57351**	.76017	**.57567**	11
50	.75363	**.56707**	.75529	**.56923**	.75693	**.57139**	.75857	**.57355**	.76020	**.57570**	10
51	.75366	**.56710**	.75531	**.56926**	.75696	**.57142**	.75859	**.57358**	.76023	**.57574**	9
+ 13′	9.75369	**.56714**	9.75534	**.56930**	9.75698	**.57146**	9.75862	**.57362**	9.76025	**.57577**	8
53	.75372	**.56717**	.75537	**.56933**	.75701	**.57149**	.75865	**.57365**	.76028	**.57581**	7
54	.75374	**.56721**	.75540	**.56937**	.75704	**.57153**	.75868	**.57369**	.76031	**.57585**	6
55	.75377	**.56725**	.75542	**.56941**	.75707	**.57157**	.75870	**.57373**	.76033	**.57588**	5
+ 14′	9.75380	**.56728**	9.75545	**.56944**	9.75709	**.57160**	9.75873	**.57376**	9.76036	**.57592**	4
57	.75383	**.56732**	.75548	**.56948**	.75712	**.57164**	.75876	**.57380**	.76039	**.57595**	3
58	.75385	**.56735**	.75550	**.56951**	.75715	**.57167**	.75879	**.57383**	.76041	**.57599**	2
59	.75388	**.56739**	.75553	**.56955**	.75718	**.57171**	.75881	**.57387**	.76044	**.57603**	1
+ 15′	9.75391	**.56743**	9.75556	**.56959**	9.75720	**.57175**	9.75884	**.57390**	9.76047	**.57606**	0
	$17^h\,29^m$		$17^h\,28^m$		$17^h\,27^m$		$17^h\,26^m$		$17^h\,25^m$		

TABLE 45.

Haversines.

	$6^h\,35^m$ **98° 45′**		$6^h\,36^m$ **99° 0′**		$6^h\,37^m$ **99° 15′**		$6^h\,38^m$ **99° 30′**		$6^h\,39^m$ **99° 45′**		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.76047	**.57606**	9.76209	**.57822**	9.76371	**.58037**	9.76531	**.58252**	9.76691	**.58467**	*60*
1	.76050	**.57610**	.76212	**.57825**	.76373	**.58041**	.76534	**.58256**	.76694	**.58471**	*59*
2	.76052	**.57613**	.76215	**.57829**	.76376	**.58044**	.76537	**.58260**	.76697	**.58475**	*58*
3	.76055	**.57617**	.76217	**.57833**	.76379	**.58048**	.76539	**.58263**	.76699	**.58478**	*57*
+ **1′**	9.76058	**.57621**	9.76220	**.57836**	9.76381	**.58051**	9.76542	**.58267**	9.76702	**.58482**	*56*
5	.76060	**.57624**	.76223	**.57840**	.76384	**.58055**	.76545	**.58270**	.76705	**.58485**	*55*
6	.76063	**.57628**	.76225	**.57843**	.76387	**.58059**	.76547	**.58274**	.76707	**.58489**	*54*
7	.76066	**.57631**	.76228	**.57847**	.76389	**.58062**	.76550	**.58277**	.76710	**.58493**	*53*
+ **2′**	9.76069	**.57635**	9.76231	**.57850**	9.76392	**.58066**	9.76553	**.58281**	9.76713	**.58496**	*52*
9	.76071	**.57639**	.76233	**.57854**	.76395	**.58069**	.76555	**.58285**	.76715	**.58500**	*51*
10	.76074	**.57642**	.76236	**.57858**	.76397	**.58073**	.76558	**.58288**	.76718	**.58503**	*50*
11	.76077	**.57646**	.76239	**.57861**	.76400	**.58077**	.76561	**.58292**	.76721	**.58507**	*49*
+ **3′**	9.76079	**.57649**	9.76241	**.57865**	9.76403	**.58080**	9.76563	**.58295**	9.76723	**.58510**	*48*
13	.76082	**.57653**	.76244	**.57868**	.76405	**.58084**	.76566	**.58299**	.76726	**.58514**	*47*
14	.76085	**.57656**	.76247	**.57872**	.76408	**.58087**	.76569	**.58303**	.76729	**.58518**	*46*
15	.76088	**.57660**	.76250	**.57876**	.76411	**.58091**	.76571	**.58306**	.76731	**.58521**	*45*
+ **4′**	9.76090	**.57664**	9.76252	**.57879**	9.76414	**.58095**	9.76574	**.58310**	9.76734	**.58525**	*44*
17	.76093	**.57667**	.76255	**.57883**	.76416	**.58098**	.76577	**.58313**	.76737	**.58528**	*43*
18	.76096	**.57671**	.76258	**.57886**	.76419	**.58102**	.76579	**.58317**	.76739	**.58532**	*42*
19	.76098	**.57675**	.76260	**.57890**	.76422	**.58105**	.76582	**.58321**	.76742	**.58536**	*41*
+ **5′**	9.76101	**.57678**	9.76263	**.57894**	9.76424	**.58109**	9.76585	**.58324**	9.76745	**.58539**	*40*
21	.76104	**.57682**	.76266	**.57897**	.76427	**.58112**	.76587	**.58328**	.76747	**.58543**	*39*
22	.76106	**.57685**	.76268	**.57901**	.76430	**.58116**	.76590	**.58331**	.76750	**.58546**	*38*
23	.76109	**.57689**	.76271	**.57904**	.76432	**.58120**	.76593	**.58335**	.76753	**.58550**	*37*
+ **6′**	9.76112	**.57692**	9.76274	**.57908**	9.76435	**.58123**	9.76595	**.58338**	9.76755	**.58553**	*36*
25	.76115	**.57696**	.76276	**.57911**	.76438	**.58127**	.76598	**.58342**	.76758	**.58557**	*35*
26	.76117	**.57700**	.76279	**.57915**	.76440	**.58130**	.76601	**.58346**	.76761	**.58561**	*34*
27	.76120	**.57703**	.76282	**.57919**	.76443	**.58134**	.76603	**.58349**	.76763	**.58564**	*33*
+ **7′**	9.76123	**.57707**	9.76285	**.57922**	9.76446	**.58138**	9.76606	**.58353**	9.76766	**.58568**	*32*
29	.76125	**.57710**	.76287	**.57926**	.76448	**.58141**	.76609	**.58356**	.76769	**.58571**	*31*
30	.76128	**.57714**	.76290	**.57929**	.76451	**.58145**	.76611	**.58360**	.76771	**.58575**	*30*
31	.76131	**.57718**	.76293	**.57933**	.76454	**.58148**	.76614	**.58364**	.76774	**.58579**	*29*
+ **8′**	9.76134	**.57721**	9.76296	**.57937**	9.76456	**.58152**	9.76617	**.58367**	9.76777	**.58582**	*28*
33	.76136	**.57725**	.76298	**.57940**	.76459	**.58156**	.76619	**.58371**	.76779	**.58586**	*27*
34	.76139	**.57728**	.76301	**.57944**	.76462	**.58159**	.76622	**.58374**	.76782	**.58589**	*26*
35	.76142	**.57732**	.76303	**.57947**	.76464	**.58163**	.76625	**.58378**	.76784	**.58593**	*25*
+ **9′**	9.76144	**.57736**	9.76306	**.57951**	9.76467	**.58166**	9.76627	**.58381**	9.76787	**.58596**	*24*
37	.76147	**.57739**	.76309	**.57955**	.76470	**.58170**	.76630	**.58385**	.76790	**.58600**	*23*
38	.76150	**.57743**	.76311	**.57958**	.76473	**.58173**	.76633	**.58389**	.76792	**.58604**	*22*
39	.76152	**.57746**	.76314	**.57962**	.76475	**.58177**	.76635	**.58392**	.76795	**.58607**	*21*
+ **10′**	9.76155	**.57750**	9.76317	**.57965**	9.76478	**.58181**	9.76638	**.58396**	9.76798	**.58611**	*20*
41	.76158	**.57753**	.76320	**.57969**	.76481	**.58184**	.76641	**.58399**	.76800	**.58614**	*19*
42	.76161	**.57757**	.76322	**.57973**	.76483	**.58188**	.76643	**.58403**	.76803	**.58618**	*18*
43	.76163	**.57761**	.76325	**.57976**	.76486	**.58191**	.76646	**.58407**	.76806	**.58622**	*17*
+ **11′**	9.76166	**.57764**	9.76328	**.57980**	9.76489	**.58195**	9.76649	**.58410**	9.76808	**.58625**	*16*
45	.76169	**.57768**	.76330	**.57983**	.76491	**.58199**	.76651	**.58414**	.76811	**.58629**	*15*
46	.76171	**.57771**	.76333	**.57987**	.76494	**.58202**	.76654	**.58417**	.76814	**.58632**	*14*
47	.76174	**.57775**	.76336	**.57990**	.76497	**.58206**	.76657	**.58421**	.76816	**.58636**	*13*
+ **12′**	9.76177	**.57779**	9.76338	**.57994**	9.76499	**.58209**	9.76659	**.58424**	9.76819	**.58639**	*12*
49	.76179	**.57782**	.76341	**.57998**	.76502	**.58213**	.76662	**.58428**	.76822	**.58643**	*11*
50	.76182	**.57786**	.76344	**.58001**	.76505	**.58217**	.76665	**.58432**	.76824	**.58647**	*10*
51	.76185	**.57789**	.76346	**.58005**	.76507	**.58220**	.76667	**.58435**	.76827	**.58650**	9
+ **13′**	9.76188	**.57793**	9.76349	**.58008**	9.76510	**.58224**	9.76670	**.58439**	9.76830	**.58654**	8
53	.76190	**.57797**	.76352	**.58012**	.76513	**.58227**	.76673	**.58442**	.76832	**.58657**	7
54	.76193	**.57800**	.76354	**.58016**	.76515	**.58231**	.76675	**.58446**	.76835	**.58661**	6
55	.76196	**.57804**	.76357	**.58019**	.76518	**.58234**	.76678	**.58450**	.76838	**.58665**	5
+ **14′**	9.76198	**.57807**	9.76360	**.58023**	9.76521	**.58238**	9.76681	**.58453**	9.76840	**.58668**	4
57	.76201	**.57811**	.76363	**.58026**	.76523	**.58242**	.76683	**.58457**	.76843	**.58671**	*3*
58	.76204	**.57815**	.76365	**.58030**	.76526	**.58245**	.76686	**.58460**	.76845	**.58675**	*2*
59	.76206	**.57818**	.76368	**.58034**	.76529	**.58249**	.76689	**.58464**	.76848	**.58679**	*1*
+ **15′**	9.76209	**.57822**	9.76371	**.58037**	9.76531	**.58252**	9.76691	**.58467**	9.76851	**.58682**	*0*
	$17^h\,24^m$		$17^h\,23^m$		$17^h\,22^m$		$17^h\,21^m$		$17^h\,20^m$		

TABLE 45.

Haversines.

s	$6^h\ 40^m$ 100° 0′		$6^h\ 41^m$ 100° 15′		$6^h\ 42^m$ 100° 30′		$6^h\ 43^m$ 100° 45′		$6^h\ 44^m$ 101° 0′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.76851	**.58682**	9.77009	**.58897**	9.77167	**.59112**	9.77325	**.59326**	9.77481	**.59540**	60
1	.76853	**.58686**	.77012	**.58901**	.77170	**.59115**	.77327	**.59330**	.77484	**.59544**	59
2	.76856	**.58690**	.77015	**.58904**	.77173	**.59119**	.77330	**.59333**	.77486	**.59548**	58
3	.76859	**.58693**	.77017	**.58908**	.77175	**.59122**	.77333	**.59337**	.77489	**.59551**	57
+ **1′**	9.76861	**.58697**	9.77020	**.58911**	9.77178	**.59126**	9.77335	**.59340**	9.77492	**.59555**	56
5	.76864	**.58700**	.77023	**.58915**	.77181	**.59130**	.77338	**.59344**	.77494	**.59558**	55
6	.76867	**.58704**	.77025	**.58919**	.77183	**.59133**	.77340	**.59348**	.77497	**.59562**	54
7	.76869	**.58707**	.77028	**.58922**	.77186	**.59137**	.77343	**.59351**	.77499	**.59565**	53
+ **2′**	9.76872	**.58711**	9.77031	**.58926**	9.77188	**.59140**	9.77346	**.59355**	9.77502	**.59569**	52
9	.76875	**.58714**	.77033	**.58929**	.77191	**.59144**	.77348	**.59358**	.77505	**.59573**	51
10	.76877	**.58718**	.77036	**.58933**	.77194	**.59148**	.77351	**.59362**	.77507	**.59576**	50
11	.76880	**.58722**	.77038	**.58937**	.77196	**.59151**	.77353	**.59365**	.77510	**.59580**	49
+ **3′**	9.76883	**.58725**	9.77041	**.58940**	9.77199	**.59155**	9.77356	**.59369**	9.77512	**.59583**	48
13	.76885	**.58729**	.77044	**.58944**	.77202	**.59158**	.77359	**.59373**	.77515	**.59587**	47
14	.76888	**.58733**	.77046	**.58947**	.77204	**.59162**	.77361	**.59376**	.77518	**.59590**	46
15	.76891	**.58736**	.77049	**.58951**	.77207	**.59165**	.77364	**.59380**	.77520	**.59594**	45
+ **4′**	9.76893	**.58740**	9.77052	**.58954**	9.77209	**.59169**	9.77366	**.59383**	9.77523	**.59598**	44
17	.76896	**.58743**	.77054	**.58858**	.77212	**.59173**	.77369	**.59387**	.77525	**.59601**	43
18	.76898	**.58747**	.77057	**.58962**	.77215	**.59176**	.77372	**.59391**	.77528	**.59605**	42
19	.76901	**.58750**	.77060	**.58965**	.77217	**.59180**	.77374	**.59394**	.77531	**.59608**	41
+ **5′**	9.76904	**.58754**	9.77062	**.58969**	9.77220	**.59183**	9.77377	**.59398**	9.77533	**.59612**	40
21	.76906	**.58758**	.77065	**.58972**	.77223	**.59187**	.77380	**.59401**	.77536	**.59615**	39
22	.76909	**.58761**	.77067	**.58976**	.77225	**.59190**	.77382	**.59405**	.77538	**.59619**	38
23	.76912	**.58765**	.77070	**.58979**	.77228	**.59194**	.77385	**.59408**	.77541	**.59623**	37
+ **6′**	9.76914	**.58768**	9.77073	**.58983**	9.77230	**.59198**	9.77387	**.59412**	9.77544	**.59626**	36
25	.76917	**.58772**	.77075	**.58987**	.77233	**.59201**	.77390	**.59416**	.77546	**.59630**	35
26	.76920	**.58776**	.77078	**.58990**	.77236	**.59205**	.77393	**.59419**	.77549	**.59633**	34
27	.76922	**.58779**	.77081	**.58994**	.77238	**.59208**	.77395	**.59423**	.77551	**.59637**	33
+ **7′**	9.76925	**.58783**	9.77083	**.58997**	9.77241	**.59212**	9.77398	**.59426**	9.77554	**.59640**	32
29	.76928	**.58786**	.77086	**.59001**	.77243	**.59215**	.77400	**.59430**	.77557	**.59644**	31
30	.76930	**.58790**	.77089	**.59005**	.77246	**.59219**	.77403	**.59433**	.77559	**.59648**	30
31	.76933	**.58793**	.77091	**.59008**	.77249	**.59223**	.77406	**.59437**	.77562	**.59651**	29
+ **8′**	9.76936	**.58797**	9.77094	**.59012**	9.77251	**.59226**	9.77408	**.59440**	9.77564	**.59655**	28
33	.76938	**.58801**	.77096	**.59015**	.77254	**.59230**	.77411	**.59444**	.77567	**.59658**	27
34	.76941	**.58804**	.77099	**.59019**	.77257	**.59233**	.77413	**.59448**	.77570	**.59662**	26
35	.76943	**.58808**	.77102	**.59022**	.77259	**.59237**	.77416	**.59451**	.77572	**.59665**	25
+ **9′**	9.76946	**.58811**	9.77104	**.59026**	9.77262	**.59240**	9.77419	**.59455**	9.77575	**.59669**	24
37	.76949	**.58815**	.77107	**.59030**	.77264	**.59244**	.77421	**.59458**	.77577	**.59672**	23
38	.76951	**.58818**	.77110	**.59033**	.77267	**.59248**	.77424	**.59462**	.77580	**.59676**	22
39	.76954	**.58822**	.77112	**.59037**	.77270	**.59251**	.77427	**.59465**	.77583	**.59680**	21
+ **10′**	9.76957	**.58826**	9.77115	**.59040**	9.77272	**.59255**	9.77429	**.59469**	9.77585	**.59683**	20
41	.76959	**.58829**	.77117	**.59044**	.77275	**.59258**	.77432	**.59473**	.77588	**.59687**	19
42	.76962	**.58833**	.77120	**.59047**	.77278	**.59262**	.77434	**.59476**	.77590	**.59690**	18
43	.76965	**.58836**	.77123	**.59051**	.77280	**.59265**	.77437	**.59480**	.77593	**.59694**	17
+ **11′**	9.76967	**.58840**	9.77125	**.59055**	9.77283	**.59269**	9.77440	**.59483**	9.77596	**.59697**	16
45	.76970	**.58843**	.77128	**.59058**	.77285	**.59273**	.77442	**.59487**	.77598	**.59701**	15
46	.76972	**.58847**	.77131	**.59062**	.77288	**.59276**	.77445	**.59490**	.77601	**.59705**	14
47	.76975	**.58851**	.77133	**.59065**	.77291	**.59280**	.77447	**.59494**	.77603	**.59708**	13
+ **12′**	9.76978	**.58854**	9.77136	**.59069**	9.77293	**.59283**	9.77450	**.59498**	9.77606	**.59712**	12
49	.76980	**.58858**	.77139	**.59072**	.77296	**.59287**	.77453	**.59501**	.77609	**.59715**	11
50	.76983	**.58861**	.77141	**.59076**	.77298	**.59290**	.77455	**.59505**	.77611	**.59719**	10
51	.76986	**.58865**	.77144	**.59080**	.77301	**.59294**	.77458	**.59508**	.77614	**.59722**	9
+ **13′**	9.76988	**.58869**	9.77146	**.59083**	9.77304	**.59298**	9.77460	**.59512**	9.77616	**.59726**	8
53	.76991	**.58872**	.77149	**.59087**	.77306	**.59301**	.77463	**.59515**	.77619	**.59730**	7
54	.76994	**.58876**	.77152	**.59090**	.77309	**.59305**	.77466	**.59519**	.77622	**.59733**	6
55	.76996	**.58879**	.77154	**.59094**	.77312	**.59308**	.77468	**.59523**	.77624	**.59737**	5
+ **14′**	9.76999	**.58883**	9.77157	**.59097**	9.77314	**.59312**	9.77471	**.59526**	9.77627	**.59740**	4
57	.77002	**.58886**	.77160	**.59101**	.77317	**.59315**	.77473	**.59530**	.77629	**.59744**	3
58	.77004	**.58890**	.77162	**.59105**	.77319	**.59319**	.77476	**.59533**	.77632	**.59747**	2
59	.77007	**.58894**	.77165	**.59108**	.77322	**.59323**	.77479	**.59537**	.77634	**.59751**	1
+ **15′**	9.77009	**.58897**	9.77167	**.59112**	9.77325	**.59326**	9.77481	**.59540**	9.77637	**.59755**	0
	$17^h\ 19^m$		$17^h\ 18^m$		$17^h\ 17^m$		$17^h\ 16^m$		$17^h\ 15^m$		

TABLE 45.

Haversines.

	$6^{h}\ 45^{m}$ **101° 15′**		$6^{h}\ 46^{m}$ **101° 30′**		$6^{h}\ 47^{m}$ **101° 45′**		$6^{h}\ 48^{m}$ **102° 0′**		$6^{h}\ 49^{m}$ **102° 15′**		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.77637	**.59755**	9.77792	**.59968**	9.77947	**.60182**	9.78101	**.60396**	9.78254	**.60609**	*60*
1	.77640	**.59758**	.77795	**.59972**	.77949	**.60185**	.78103	**.60399**	.78256	**.60612**	*59*
2	.77642	**.59762**	.77797	**.59976**	.77952	**.60189**	.78106	**.60403**	.78259	**.60616**	*58*
3	.77645	**.59765**	.77800	**.59979**	.77954	**.60193**	.78108	**.60406**	.78261	**.60620**	*57*
+ **1′**	9.77647	**.59769**	9.77803	**.59983**	9.77957	**.60196**	9.78111	**.60410**	9.78264	**.60623**	*56*
5	.77650	**.59772**	.77805	**.59986**	.77960	**.60200**	.78113	**.60414**	.78266	**.60627**	*55*
6	.77653	**.59776**	.77808	**.59990**	.77962	**.60203**	.78116	**.60417**	.78269	**.60630**	*54*
7	.77655	**.59779**	.77810	**.59993**	.77965	**.60207**	.78118	**.60420**	.78271	**.60634**	*53*
+ **2′**	9.77658	**.59783**	9.77813	**.59997**	9.77967	**.60211**	9.78121	**.60424**	9.78274	**.60637**	*52*
9	.77660	**.59787**	.77815	**.60000**	.77970	**.60214**	.78124	**.60428**	.78277	**.60641**	*51*
10	.77663	**.59790**	.77818	**.60004**	.77972	**.60218**	.78126	**.60431**	.78279	**.60644**	*50*
11	.77666	**.59794**	.77821	**.60008**	.77975	**.60221**	.78129	**.60435**	.78282	**.60648**	*49*
+ **3′**	9.77668	**.59797**	9.77823	**.60011**	9.77978	**.60225**	9.78131	**.60438**	9.78284	**.60652**	*48*
13	.77671	**.59801**	.77826	**.60015**	.77980	**.60228**	.78134	**.60442**	.78287	**.60655**	*47*
14	.77673	**.59804**	.77828	**.60018**	.77983	**.60232**	.78136	**.60445**	.78289	**.60659**	*46*
15	.77676	**.59808**	.77831	**.60022**	.77985	**.60235**	.78139	**.60449**	.78292	**.60662**	*45*
+ **4′**	9.77679	**.59812**	9.77834	**.60025**	9.77988	**.60239**	9.78141	**.60452**	9.78294	**.60666**	*44*
17	.77681	**.59815**	.77836	**.60029**	.77990	**.60243**	.78144	**.60456**	.78297	**.60669**	*43*
18	.77684	**.59819**	.77839	**.60033**	.77993	**.60246**	.78147	**.60460**	.78299	**.60673**	*42*
19	.77686	**.59822**	.77841	**.60036**	.77996	**.60250**	.78149	**.60463**	.78302	**.60676**	*41*
+ **5′**	9.77689	**.59826**	9.77844	**.60040**	9.77998	**.60253**	9.78152	**.60467**	9.78305	**.60680**	*40*
21	.77691	**.59829**	.77846	**.60043**	.78001	**.60257**	.78154	**.60470**	.78307	**.60684**	*39*
22	.77694	**.59833**	.77849	**.60047**	.78003	**.60260**	.78157	**.60474**	.78310	**.60687**	*38*
23	.77697	**.59837**	.77852	**.60050**	.78006	**.60264**	.78159	**.60477**	.78312	**.60691**	*37*
+ **6′**	9.77699	**.59840**	9.77854	**.60054**	9.78008	**.60268**	9.78162	**.60481**	9.78315	**.60694**	*36*
25	.77702	**.59844**	.77857	**.60057**	.78011	**.60271**	.78164	**.60484**	.78317	**.60698**	*35*
26	.77704	**.59847**	.77859	**.60061**	.78013	**.60275**	.78167	**.60488**	.78320	**.60701**	*34*
27	.77707	**.59851**	.77862	**.60065**	.78016	**.60278**	.78170	**.60492**	.78322	**.60705**	*33*
+ **7′**	9.77710	**.59854**	9.77864	**.60068**	9.78019	**.60282**	9.78172	**.60495**	9.78325	**.60708**	*32*
29	.77712	**.59858**	.77867	**.60072**	.78021	**.60285**	.78175	**.60499**	.78327	**.60712**	*31*
30	.77715	**.59861**	.77870	**.60075**	.78024	**.60289**	.78177	**.60502**	.78330	**.60715**	*30*
31	.77717	**.59865**	.77872	**.60079**	.78026	**.60292**	.78180	**.60506**	.78332	**.60719**	*29*
+ **8′**	9.77720	**.59869**	9.77875	**.60082**	9.78029	**.60296**	9.78182	**.60509**	9.78335	**.60723**	*28*
33	.77723	**.59872**	.77877	**.60086**	.78031	**.60300**	.78185	**.60513**	.78338	**.60726**	*27*
34	.77725	**.59876**	.77880	**.60090**	.78034	**.60303**	.78187	**.60516**	.78340	**.60730**	*26*
35	.77728	**.59879**	.77882	**.60093**	.78037	**.60307**	.78190	**.60520**	.78343	**.60733**	*25*
+ **9′**	9.77730	**.59883**	9.77885	**.60097**	9.78039	**.60310**	9.78192	**.60524**	9.78345	**.60737**	*24*
37	.77733	**.59886**	.77888	**.60100**	.78042	**.60314**	.78195	**.60527**	.78348	**.60740**	*23*
38	.77735	**.59890**	.77890	**.60104**	.78044	**.60317**	.78198	**.60531**	.78350	**.60744**	*22*
39	.77738	**.59894**	.77893	**.60107**	.78047	**.60321**	.78200	**.60534**	.78353	**.60747**	*21*
+ **10′**	9.77741	**.59897**	9.77895	**.60111**	9.78049	**.60324**	9.78203	**.60538**	9.78355	**.60751**	*20*
41	.77743	**.59901**	.77898	**.60114**	.78052	**.60328**	.78205	**.60541**	.78358	**.60755**	*19*
42	.77746	**.59904**	.77900	**.60118**	.78054	**.60332**	.78208	**.60545**	.78360	**.60758**	*18*
43	.77748	**.59908**	.77903	**.60122**	.78057	**.60335**	.78210	**.60548**	.78363	**.60762**	*17*
+ **11′**	9.77751	**.59911**	9.77906	**.60125**	9.78060	**.60339**	9.78213	**.60552**	9.78365	**.60765**	*16*
45	.77754	**.59915**	.77908	**.60129**	.78062	**.60342**	.78215	**.60556**	.78368	**.60769**	*15*
46	.77756	**.59919**	.77911	**.60132**	.78065	**.60346**	.78218	**.60559**	.78371	**.60772**	*14*
47	.77759	**.59922**	.77913	**.60136**	.78067	**.60349**	.78221	**.60563**	.78373	**.60776**	*13*
+ **12′**	9.77761	**.59926**	9.77916	**.60139**	9.78070	**.60353**	9.78223	**.60566**	9.78376	**.60779**	*12*
49	.77764	**.59929**	.77918	**.60143**	.78072	**.60356**	.78226	**.60570**	.78378	**.60783**	*11*
50	.77766	**.59933**	.77921	**.60146**	.78075	**.60360**	.78228	**.60573**	.78381	**.60786**	*10*
51	.77769	**.59936**	.77924	**.60150**	.78077	**.60364**	.78231	**.60577**	.78383	**.60790**	*9*
+ **13′**	9.77772	**.59940**	9.77926	**.60154**	9.78080	**.60367**	9.78233	**.60580**	9.78386	**.60794**	*8*
53	.77774	**.59943**	.77929	**.60157**	.78083	**.60371**	.78236	**.60584**	.78388	**.60797**	*7*
54	.77777	**.59947**	.77931	**.60161**	.78085	**.60374**	.78238	**.60588**	.78391	**.60801**	*6*
55	.77779	**.59951**	.77934	**.60164**	.78088	**.60378**	.78241	**.60591**	.78393	**.60804**	*5*
+ **14′**	9.77782	**.59954**	9.77936	**.60168**	9.78090	**.60381**	9.78243	**.60595**	9.78396	**.60808**	*4*
57	.77785	**.59958**	.77939	**.60171**	.78093	**.60385**	.78246	**.60598**	.78398	**.60811**	*3*
58	.77787	**.59961**	.77942	**.60175**	.78095	**.60388**	.78249	**.60602**	.78401	**.60815**	*2*
59	.77790	**.59965**	.77944	**.60179**	.78098	**.60392**	.78251	**.60605**	.78404	**.60818**	*1*
+ **15′**	9.77792	**.59968**	9.77947	**.60182**	9.78101	**.60396**	9.78254	**.60609**	9.78406	**.60822**	*0*
	$17^{h}\ 14^{m}$		$17^{h}\ 13^{m}$		$17^{h}\ 12^{m}$		$17^{h}\ 11^{m}$		$17^{h}\ 10^{m}$		

TABLE 45.

Haversines.

s	$6^h\,50^m$ 102° 30′		$6^h\,51^m$ 102° 45′		$6^h\,52^m$ 103° 0′		$6^h\,53^m$ 103° 15′		$6^h\,54^m$ 103° 30′		s
	Log. Hav.	Nat. Hav.	Hav.Log.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.78406	.60822	9.78558	.61035	9.78709	.61248	9.78859	.61460	9.79009	.61672	60
1	.78409	.60825	.78560	.61038	.78711	.61251	.78862	.61464	.79011	.61676	59
2	.78411	.60829	.78563	.61042	.78714	.61255	.78864	.61467	.79014	.61679	58
3	.78414	.60833	.78565	.61046	.78716	.61258	.78867	.61471	.79016	.61683	57
+ 1′	9.78416	.60836	9.78568	.61049	9.78719	.61262	9.78869	.61474	9.79019	.61686	56
5	.78419	.60840	.78570	.61053	.78721	.61265	.78872	.61478	.79021	.61690	55
6	.78421	.60843	.78573	.61056	.78724	.61269	.78874	.61481	.79024	.61693	54
7	.78424	.60847	.78575	.61060	.78726	.61272	.78877	.61485	.79026	.61697	53
+ 2′	9.78426	.60850	9.78578	.61063	9.78729	.61276	9.78879	.61488	9.79029	.61701	52
9	.78429	.60854	.78581	.61067	.78731	.61279	.78882	.61492	.79031	.61704	51
10	.78431	.60857	.78583	.61070	.78734	.61283	.78884	.61495	.79034	.61708	50
11	.78434	.60861	.78586	.61074	.78737	.61287	.78887	.61499	.79036	.61711	49
+ 3′	9.78436	.60865	9.78588	.61077	9.78739	.61290	9.78889	.61502	9.79039	.61715	48
13	.78439	.60868	.78591	.61081	.78742	.61294	.78892	.61506	.79041	.61718	47
14	.78442	.60872	.78593	.61085	.78744	.61297	.78894	.61510	.79044	.61722	46
15	.78444	.60875	.78596	.61088	.78747	.61301	.78897	.61513	.79046	.61725	45
+ 4′	9.78447	.60879	9.78598	.61092	9.78749	.61304	9.78899	.61517	9.79049	.61729	44
17	.78449	.60882	.78601	.61095	.78752	.61308	.78902	.61520	.79051	.61732	43
18	.78452	.60886	.78603	.61099	.78754	.61311	.78904	.61524	.79054	.61736	42
19	.78454	.60889	.78606	.61102	.78757	.61315	.78907	.61527	.79056	.61739	41
+ 5′	9.78457	.60893	9.78608	.61106	9.78759	.61318	9.78909	.61531	9.79059	.61743	40
21	.78459	.60897	.78611	.61109	.78762	.61322	.78912	.61534	.79061	.61747	39
22	.78462	.60900	.78613	.61113	.78764	.61325	.78914	.61538	.79064	.61750	38
23	.78464	.60904	.78616	.61116	.78767	.61329	.78917	.61541	.79066	.61754	37
+ 6′	9.78467	.60907	9.78618	.61120	9.78769	.61333	9.78919	.61545	9.79069	.61757	36
25	.78469	.60911	.78621	.61124	.78772	.61336	.78922	.61548	.79071	.61761	35
26	.78472	.60914	.78623	.61127	.78774	.61340	.78924	.61552	.79074	.61764	34
27	.78474	.60918	.78626	.61131	.78777	.61343	.78927	.61556	.79076	.61768	33
+ 7′	9.78477	.60921	9.78628	.61134	9.78779	.61347	9.78929	.61559	9.79079	.61771	32
29	.78479	.60925	.78631	.61138	.78782	.61350	.78932	.61563	.79081	.61775	31
30	.78482	.60928	.78633	.61141	.78784	.61354	.78934	.61566	.79084	.61778	30
31	.78485	.60932	.78636	.61145	.78787	.61357	.78937	.61570	.79086	.61782	29
+ 8′	9.78487	.60936	9.78638	.61148	9.78789	.61361	9.78939	.61573	9.79089	.61785	28
33	.78490	.60939	.78641	.61152	.78792	.61364	.78942	.61577	.79091	.61789	27
34	.78492	.60943	.78643	.61155	.78794	.61368	.78944	.61580	.79094	.61792	26
35	.78495	.60946	.78646	.61159	.78797	.61372	.78947	.61584	.79096	.61796	25
+ 9′	9.78497	.60950	9.78649	.61163	9.78799	.61375	9.78949	.61587	9.79099	.61800	24
37	.78500	.60953	.78651	.61166	.78802	.61379	.78952	.61591	.79101	.61803	23
38	.78502	.60957	.78654	.61170	.78804	.61382	.78954	.61594	.79103	.61807	22
39	.78505	.60960	.78656	.61173	.78807	.61386	.78957	.61598	.79106	.61810	21
+ 10′	9.78507	.60964	9.78659	.61177	9.78809	.61389	9.78959	.61602	9.79108	.61814	20
41	.78510	.60967	.78661	.61180	.78812	.61393	.78962	.61605	.79111	.61817	19
42	.78512	.60971	.78664	.61184	.78814	.61396	.78964	.61609	.79113	.61821	18
43	.78515	.60975	.78666	.61187	.78817	.61400	.78967	.61612	.79116	.61824	17
+ 11′	9.78517	.60978	9.78669	.61191	9.78819	.61403	9.78969	.61616	9.79118	.61828	16
45	.78520	.60982	.78671	.61194	.78822	.61407	.78972	.61619	.79121	.61831	15
46	.78522	.60985	.78674	.61198	.78824	.61410	.78974	.61623	.79123	.61835	14
47	.78525	.60989	.78676	.61201	.78827	.61414	.78977	.61626	.79126	.61838	13
+ 12′	9.78528	.60992	9.78679	.61205	9.78829	.61418	9.78979	.61630	9.79128	.61842	12
49	.78530	.60996	.78681	.61209	.78832	.61421	.78982	.61633	.79131	.61845	11
50	.78533	.60999	.78684	.61212	.78834	.61425	.78984	.61637	.79133	.61849	10
51	.78535	.61003	.78686	.61216	.78837	.61428	.78987	.61640	.79136	.61853	9
+ 13′	9.78538	.61007	9.78689	.61219	9.78839	.61432	9.78989	.61644	9.79138	.61856	8
53	.78540	.61010	.78691	.61223	.78842	.61435	.78992	.61648	.79141	.61860	7
54	.78543	.61014	.78694	.61226	.78844	.61439	.78994	.61651	.79143	.61863	6
55	.78545	.61017	.78696	.61230	.78847	.61442	.78997	.61655	.79146	.61867	5
+ 14′	9.78548	.61021	9.78699	.61233	9.78849	.61446	9.78999	.61658	9.79148	.61870	4
57	.78550	.61024	.78701	.61237	.78852	.61449	.79002	.61662	.79151	.61874	3
58	.78553	.61028	.78704	.61240	.78854	.61453	.79004	.61665	.79153	.61877	2
59	.78555	.61032	.78706	.61244	.78857	.61456	.79007	.61669	.79156	.61881	1
+ 15′	9.78558	.61035	9.78709	.61248	9.78859	.61460	9.79009	.61672	9.79158	.61884	0
	$17^h\,9^m$		$17^h\,8^m$		$17^h\,7^m$		$17^h\,6^m$		$17^h\,5^m$		

TABLE 45.

Haversines.

	$6^h\ 55^m$ **103° 45′**		$6^h\ 56^m$ **104° 0′**		$6^h\ 57^m$ **104° 15′**		$6^h\ 58^m$ **104° 30′**		$6^h\ 59^m$ **104° 45′**		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.79158	**.61884**	9.79306	**.62096**	9.79454	**.62308**	9.79601	**.62519**	9.79748	**.62730**	60
1	.79161	**.61888**	.79309	**.62100**	.79457	**.62311**	.79604	**.62522**	.79750	**.62734**	59
2	.79163	**.61891**	.79311	**.62103**	.79459	**.62315**	.79606	**.62526**	.79752	**.62737**	58
3	.79165	**.61895**	.79314	**.62107**	.79462	**.62318**	.79609	**.62530**	.79755	**.62741**	57
+ **1′**	9.79168	**.61898**	9.79316	**.62110**	9.79464	**.62322**	9.79611	**.62533**	9.79757	**.62744**	56
5	.79170	**.61902**	.79319	**.62114**	.79466	**.62325**	.79613	**.62537**	.79760	**.62748**	55
6	.79173	**.61905**	.79321	**.62117**	.79469	**.62329**	.79616	**.62540**	.79762	**.62751**	54
7	.79175	**.61909**	.79324	**.62121**	.79471	**.62332**	.79618	**.62544**	.79765	**.62755**	53
+ **2′**	9.79178	**.61913**	9.79326	**.62124**	9.79474	**.62336**	9.79621	**.62547**	9.79767	**.62758**	52
9	.79180	**.61916**	.79329	**.62128**	.79476	**.62339**	.79623	**.62551**	.79770	**.62762**	51
10	.79183	**.61920**	.79331	**.62131**	.79479	**.62343**	.79626	**.62554**	.79772	**.62765**	50
11	.79185	**.61923**	.79334	**.62135**	.79481	**.62346**	.79628	**.62558**	.79774	**.62769**	49
+ **3′**	9.79188	**.61927**	9.79336	**.62138**	9.79484	**.62350**	9.79631	**.62561**	9.79777	**.62772**	48
13	.79190	**.61930**	.79339	**.62142**	.79486	**.62353**	.79633	**.62565**	.79779	**.62776**	47
14	.79193	**.61934**	.79341	**.62145**	.79489	**.62357**	.79635	**.62568**	.79782	**.62779**	46
15	.79195	**.61937**	.79343	**.62149**	.79491	**.62361**	.79638	**.62572**	.79784	**.62783**	45
+ **4′**	9.79198	**.61941**	9.79346	**.62153**	9.79493	**.62364**	9.79640	**.62575**	9.79787	**.62786**	44
17	.79200	**.61944**	.79348	**.62156**	.79496	**.62368**	.79643	**.62579**	.79789	**.62790**	43
18	.79203	**.61948**	.79351	**.62160**	.79498	**.62371**	.79645	**.62582**	.79791	**.62793**	42
19	.79205	**.61951**	.79353	**.62163**	.79501	**.62375**	.79648	**.62586**	.79794	**.62797**	41
+ **5′**	9.79208	**.61955**	9.79356	**.62167**	9.79503	**.62378**	9.79650	**.62589**	9.79796	**.62800**	40
21	.79210	**.61958**	.79358	**.62170**	.79506	**.62382**	.79653	**.62593**	.79799	**.62804**	39
22	.79213	**.61962**	.79361	**.62174**	.79508	**.62385**	.79655	**.62596**	.79801	**.62807**	38
23	.79215	**.61966**	.79363	**.62177**	.79511	**.62389**	.79657	**.62600**	.79804	**.62811**	37
+ **6′**	9.79217	**.61969**	9.79366	**.62181**	9.79513	**.62392**	9.79660	**.62603**	9.79806	**.62814**	36
25	.79220	**.61973**	.79368	**.62184**	.79516	**.62396**	.79662	**.62607**	.79808	**.62818**	35
26	.79222	**.61976**	.79371	**.62188**	.79518	**.62399**	.79665	**.62611**	.79811	**.62822**	34
27	.79225	**.61980**	.79373	**.62191**	.79520	**.62403**	.79667	**.62614**	.79813	**.62825**	33
+ **7′**	9.79227	**.61983**	9.79376	**.62195**	9.79523	**.62406**	9.79670	**.62618**	9.79816	**.62829**	32
29	.79230	**.61987**	.79378	**.62198**	.79525	**.62410**	.79672	**.62621**	.79818	**.62832**	31
30	.79232	**.61990**	.79380	**.62202**	.79528	**.62413**	.79674	**.62625**	.79821	**.62836**	30
31	.79235	**.61994**	.79383	**.62205**	.79530	**.62417**	.79677	**.62628**	.79823	**.62839**	29
+ **8′**	9.79237	**.61997**	9.79385	**.62209**	9.79533	**.62420**	9.79679	**.62632**	9.79825	**.62843**	28
33	.79240	**.62001**	.79388	**.62213**	.79535	**.62424**	.79682	**.62635**	.79828	**.62846**	27
34	.79242	**.62004**	.79390	**.62216**	.79538	**.62427**	.79684	**.62639**	.79830	**.62850**	26
35	.79245	**.62008**	.79393	**.62220**	.79540	**.62431**	.79687	**.62642**	.79833	**.62853**	25
+ **9′**	9.79247	**.62011**	9.79395	**.62223**	9.79542	**.62434**	9.79689	**.62646**	9.79835	**.62857**	24
37	.79250	**.62015**	.79398	**.62227**	.79545	**.62438**	.79692	**.62649**	.79838	**.62860**	23
38	.79252	**.62018**	.79400	**.62230**	.79547	**.62442**	.79694	**.62653**	.79840	**.62864**	22
39	.79255	**.62022**	.79403	**.62234**	.79550	**.62445**	.79696	**.62656**	.79842	**.62867**	21
+ **10′**	9.79257	**.62026**	9.79405	**.62237**	9.79552	**.62449**	9.79699	**.62660**	9.79845	**.62871**	20
41	.79260	**.62029**	.79407	**.62241**	.79555	**.62452**	.79701	**.62663**	.79847	**.62874**	19
42	.79262	**.62033**	.79410	**.62244**	.79557	**.62456**	.79704	**.62667**	.79850	**.62878**	18
43	.79264	**.62036**	.79412	**.62248**	.79560	**.62459**	.79706	**.62670**	.79852	**.62881**	17
+ **11′**	9.79267	**.62040**	9.79415	**.62251**	9.79562	**.62463**	9.79709	**.62674**	9.79855	**.62885**	16
45	.79269	**.62043**	.79417	**.62255**	.79565	**.62466**	.79711	**.62677**	.79857	**.62888**	15
46	.79272	**.62047**	.79420	**.62258**	.79567	**.62470**	.79714	**.62681**	.79859	**.62892**	14
47	.79274	**.62050**	.79422	**.62262**	.79569	**.62473**	.79716	**.62684**	.79862	**.62895**	13
+ **12′**	9.79277	**.62054**	9.79425	**.62265**	9.79572	**.62477**	9.79718	**.62688**	9.79864	**.62899**	12
49	.79279	**.62057**	.79427	**.62269**	.79574	**.62480**	.79721	**.62691**	.79867	**.62902**	11
50	.79282	**.62061**	.79430	**.62272**	.79577	**.62484**	.79723	**.62695**	.79869	**.62906**	10
51	.79284	**.62064**	.79432	**.62276**	.79579	**.62487**	.79726	**.62698**	.79872	**.62909**	9
+ **13′**	9.79287	**.62068**	9.79434	**.62279**	9.79582	**.62491**	9.79728	**.62702**	9.79874	**.62913**	8
53	.79289	**.62071**	.79437	**.62283**	.79584	**.62494**	.79731	**.62706**	.79876	**.62916**	7
54	.79292	**.62075**	.79439	**.62287**	.79587	**.62498**	.79733	**.62709**	.79879	**.62920**	6
55	.79294	**.62078**	.79442	**.62290**	.79589	**.62501**	.79735	**.62713**	.79881	**.62923**	5
+ **14′**	9.79297	**.62082**	9.79444	**.62294**	9.79591	**.62505**	9.79738	**.62716**	9.79884	**.62927**	4
57	.79299	**.62086**	.79447	**.62297**	.79594	**.62508**	.79740	**.62720**	.79886	**.62930**	3
58	.79301	**.62089**	.79449	**.62301**	.79596	**.62512**	.79743	**.62723**	.79888	**.62934**	2
59	.79304	**.62093**	.79452	**.62304**	.79599	**.62515**	.79745	**.62727**	.79891	**.62937**	1
+ **15′**	9.79306	**.62096**	9.79454	**.62308**	9.79601	**.62519**	9.79748	**.62730**	9.79893	**.62941**	0
	$17^h\ 4^m$		$17^h\ 3^m$		$17^h\ 2^m$		$17^h\ 1^m$		$17^h\ 0^m$		

TABLE 45.

Haversines.

	$7^h 0^m$ 105° 0′		$7^h 1^m$ 105° 15′		$7^h 2^m$ 105° 30′		$7^h 3^m$ 105° 45′		$7^h 4^m$ 106° 0′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.79893	.62941	9.80038	.63152	9.80183	.63362	9.80327	.63572	9.80470	.63782	60
1	.79896	.62944	.80041	.63155	.80185	.63365	.80329	.63576	.80472	.63785	59
2	.79898	.62948	.80043	.63159	.80188	.63369	.80331	.63579	.80474	.63789	58
3	.79901	.62951	.80046	.63162	.80190	.63372	.80334	.63583	.80477	.63792	57
+ 1′	9.79903	.62955	9.80048	.63166	9.80192	.63376	9.80336	.63586	9.80479	.63796	56
5	.79905	.62958	.80050	.63169	.80195	.63379	.80339	.63590	.80482	.63799	55
6	.79908	.62962	.80053	.63173	.80197	.63383	.80341	.63593	.80484	.63803	54
7	.79910	.62965	.80055	.63176	.80200	.63386	.80343	.63597	.80486	.63806	53
+ 2′	9.79913	.62969	9.80058	.63180	9.80202	.63390	9.80346	.63600	9.80489	.63810	52
9	.79915	.62973	.80060	.63183	.80204	.63393	.80348	.63604	.80491	.63813	51
10	.79918	.62976	.80063	.63187	.80207	.63397	.80351	.63607	.80494	.63817	50
11	.79920	.62980	.80065	.63190	.80209	.63400	.80353	.63611	.80496	.63820	49
+ 3′	9.79922	.62983	9.80067	.63194	9.80212	.63404	9.80355	.63614	9.80498	.63824	48
13	.79925	.62987	.80070	.63197	.80214	.63407	.80358	.63618	.80501	.63827	47
14	.79927	.62990	.80072	.63201	.80216	.63411	.80360	.63621	.80503	.63831	46
15	.79930	.62994	.80075	.63204	.80219	.63414	.80362	.63625	.80505	.63834	45
+ 4′	9.79932	.62997	9.80077	.63208	9.80221	.63418	9.80365	.63628	9.80508	.63838	44
17	.79935	.63001	.80079	.63211	.80224	.63421	.80367	.63632	.80510	.63841	43
18	.79937	.63004	.80082	.63215	.80226	.63425	.80370	.63635	.80513	.63845	42
19	.79939	.63008	.80084	.63218	.80228	.63428	.80372	.63639	.80515	.63848	41
+ 5′	9.79942	.63011	9.80087	.63222	9.80231	.63432	9.80374	.63642	9.80517	.63852	40
21	.79944	.63015	.80089	.63225	.80233	.63435	.80377	.63646	.80520	.63855	39
22	.79947	.63018	.80091	.63229	.80236	.63439	.80379	.63649	.80522	.63859	38
23	.79949	.63022	.80094	.63232	.80238	.63442	.80382	.63653	.80524	.63862	37
+ 6′	9.79951	.63025	9.80096	.63236	9.80240	.63446	9.80384	.63656	9.80527	.63866	36
25	.79954	.63029	.80099	.63239	.80243	.63450	.80386	.63660	.80529	.63869	35
26	.79956	.63032	.80101	.63243	.80245	.63453	.80389	.63663	.80532	.63873	34
27	.79959	.63036	.80103	.63246	.80248	.63457	.80391	.63666	.80534	.63876	33
+ 7′	9.79961	.63039	9.80106	.63250	9.80250	.63460	9.80393	.63670	9.80536	.63880	32
29	.79964	.63043	.80108	.63253	.80252	.63464	.80396	.63673	.80539	.63883	31
30	.79966	.63046	.80111	.63257	.80255	.63467	.80398	.63677	.80541	.63887	30
31	.79968	.63050	.80113	.63260	.80257	.63471	.80401	.63680	.80543	.63890	29
+ 8′	9.79971	.63053	9.80116	.63264	9.80260	.63474	9.80403	.63684	9.80546	.63894	28
33	.79973	.63057	.80118	.63267	.80262	.63478	.80405	.63687	.80548	.63897	27
34	.79976	.63060	.80120	.63271	.80264	.63481	.80408	.63691	.80551	.63901	26
35	.79978	.63064	.80123	.63274	.80267	.63485	.80410	.63694	.80553	.63904	25
+ 9′	9.79980	.63067	9.80125	.63278	9.80269	.63488	9.80413	.63698	9.80555	.63908	24
37	.79983	.63071	.80128	.63281	.80272	.63492	.80415	.63701	.80558	.63911	23
38	.79985	.63074	.80130	.63285	.80274	.63495	.80417	.63705	.80560	.63915	22
39	.79988	.63078	.80132	.63288	.80276	.63499	.80420	.63708	.80562	.63918	21
+ 10′	9.79990	.63081	9.80135	.63292	9.80279	.63502	9.80422	.63712	9.80565	.63922	20
41	.79993	.63085	.80137	.63295	.80281	.63506	.80424	.63715	.80567	.63925	19
42	.79995	.63088	.80140	.63299	.80284	.63509	.80427	.63719	.80570	.63929	18
43	.79997	.63092	.80142	.63302	.80286	.63513	.80429	.63722	.80572	.63932	17
+ 11′	9.80000	.63095	9.80144	.63306	9.80288	.63516	9.80432	.63726	9.80574	.63936	16
45	.80002	.63099	.80147	.63309	.80291	.63520	.80434	.63729	.80577	.63939	15
46	.80005	.63102	.80149	.63313	.80293	.63523	.80436	.63733	.80579	.63943	14
47	.80007	.63106	.80152	.63316	.80296	.63527	.80439	.63736	.80581	.63946	13
+ 12′	9.80009	.63109	9.80154	.63320	9.80298	.63530	9.80441	.63740	9.80584	.63950	12
49	.80012	.63113	.80156	.63323	.80300	.63534	.80444	.63743	.80586	.63953	11
50	.80014	.63116	.80159	.63327	.80303	.63537	.80446	.63747	.80589	.63957	10
51	.80017	.63120	.80161	.63330	.80305	.63541	.80448	.63750	.80591	.63960	9
+ 13′	9.80019	.63123	9.80164	.63334	9.80307	.63544	9.80451	.63754	9.80593	.63964	8
53	.80022	.63127	.80166	.63337	.80310	.63548	.80453	.63757	.80596	.63967	7
54	.80024	.63131	.80168	.63341	.80312	.63551	.80455	.63761	.80598	.63971	6
55	.80026	.63134	.80171	.63344	.80315	.63555	.80458	.63764	.80600	.63974	5
+ 14′	9.80029	.63138	9.80173	.63348	9.80317	.63558	9.80460	.63768	9.80603	.63977	4
57	.80031	.63142	.80176	.63351	.80319	.63562	.80463	.63771	.80605	.63981	3
58	.80034	.63145	.80178	.63355	.80322	.63565	.80465	.63775	.80607	.63984	2
59	.80036	.63148	.80180	.63358	.80324	.63569	.80467	.63778	.80610	.63988	1
+ 15′	9.80038	.63152	9.80183	.63362	9.80327	.63572	9.80470	.63782	9.80612	.63991	0
	$16^h 59^m$		$16^h 58^m$		$16^h 57^m$		$16^h 56^m$		$16^h 55^m$		

TABLE 45.

Haversines.

	$7^h\,5^m$ 106° 15′		$7^h\,6^m$ 106° 30′		$7^h\,7^m$ 106° 45′		$7^h\,8^m$ 107° 0′		$7^h\,9^m$ 107° 15′		
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.80612	.63991	9.80754	.64201	9.80895	.64410	9.81036	.64619	9.81176	.64827	60
1	.80615	.63995	.80756	.64204	.80898	.64413	.81038	.64622	.81178	.64831	59
2	.80617	.63998	.80759	.64208	.80900	.64417	.81040	.64626	.81180	.64834	58
3	.80619	.64002	.80761	.64211	.80902	.64420	.81043	.64629	.81183	.64838	57
+ 1′	9.80622	.64005	9.80763	.04215	9.80905	.64424	9.81045	.64632	9.81185	.64841	56
5	.80624	.64009	.80766	.64218	.80907	.64427	.81047	.64636	.81187	.64844	55
6	.80626	.64012	.80768	.64222	.80909	.64431	.81050	.64639	.81190	.64848	54
7	.80629	.64016	.80771	.64225	.80912	.64434	.81052	.64643	.81192	.64851	53
+ 2′	9.80631	.64019	9.80773	.64229	9.80914	.64438	9.81054	.64646	9.81194	.64855	52
9	.80634	.64023	.80775	.64232	.80916	.64441	.81057	.64650	.81197	.64858	51
10	.80636	.64026	.80778	.64236	.80919	.64445	.81059	.64653	.81199	.64862	50
11	.80638	.64030	.80780	.64239	.80921	.64448	.81061	.64657	.81201	.64865	49
+ 3′	9.80641	.64033	9.80782	.64243	9.80923	.64452	9.81064	.64660	9.81204	.64869	48
13	.80643	.64037	.80785	.64246	.80926	.64455	.81066	.64664	.81206	.64872	47
14	.80645	.64040	.80787	.64250	.80928	.64459	.81068	.64667	.81208	.64876	46
15	.80648	.64044	.80789	.64253	.80930	.64462	.81071	.64671	.81211	.64879	45
+ 4′	9.80650	.64047	9.80792	.64257	9.80933	.64466	.81073	.64674	9.81213	.64883	44
17	.80652	.64051	.80794	.64260	.80935	.64469	.81075	.64678	.81215	.64886	43
18	.80655	.64054	.80796	.64264	.80937	.64472	.81078	.64681	.81217	.64890	42
19	.80657	.64058	.80799	.64267	.80940	.64476	.81080	.64685	.81220	.64893	41
+ 5′	9.80660	.64061	9.80801	.64270	9.80942	.64479	9.81082	.64688	9.81222	.64897	40
21	.80662	.64065	.80804	.64274	.80944	.64483	.81085	.64692	.81224	.64900	39
22	.80664	.64068	.80806	.64277	.80947	.64486	.81087	.64695	.81227	.64903	38
23	.80667	.64072	.80808	.64281	.80949	.64490	.81089	.64699	.81229	.64907	37
+ 6′	9.80669	.64075	9.80811	.64284	9.80952	.64493	9.81092	.64702	9.81231	.64910	36
25	.80671	.64079	.80813	.64288	.80954	.64497	.81094	.64705	.81234	.64914	35
26	.80674	.64082	.80815	.64291	.80956	.64500	.81096	.64709	.81236	.64917	34
27	.80676	.64086	.80818	.64295	.80959	.64504	.81099	.64712	.81238	.64921	33
+ 7′	9.80678	.64089	9.80820	.64298	9.80961	.64507	9.81101	.64716	9.81241	.64924	32
29	.80681	.64093	.80822	.64302	.80963	.64511	.81103	.64719	.81243	.64928	31
30	.80683	.64096	.80825	.64305	.80966	.64514	.81106	.64723	.81245	.64931	30
31	.80686	.64100	.80827	.64309	.80968	.64518	.81108	.64726	.81248	.64935	29
+ 8′	9.80688	.64103	9.80829	.64312	9.80970	.64521	9.81110	.64730	9.81250	.64938	28
33	.80690	.64107	.80832	.64316	.80973	.64525	.81113	.64733	.81252	.64942	27
34	.80693	.64110	.80834	.64319	.80975	.64528	.81115	.64737	.81255	.64945	26
35	.80695	.64114	.80836	.64323	.80977	.64532	.81117	.64740	.81257	.64949	25
+ 9′	9.80697	.64117	9.80839	.64326	9.80980	.64535	9.81120	.64744	9.81259	.64952	24
37	.80700	.64121	.80841	.64330	.80982	.64539	.81122	.64747	.81262	.64956	23
38	.80702	.64124	.80844	.64333	.80984	.64542	.81124	.64751	.81264	.64959	22
39	.80704	.64128	.80846	.64337	.80987	.64546	.81127	.64754	.81266	.64962	21
+ 10′	9.80707	.64131	9.80848	.64340	9.80989	.64549	9.81129	.64758	9.81269	.64966	20
41	.80709	.64135	.80851	.64344	.80991	.64552	.81131	.64761	.81271	.64969	19
42	.80712	.64138	.80853	.64347	.80994	.64556	.81134	.64765	.81273	.64973	18
43	.80714	.64142	.80855	.64351	.80996	.64559	.81136	.64768	.81276	.64976	17
+ 11′	9.80716	.64145	9.80858	.64354	9.80998	.64563	9.81138	.64772	9.81278	.64980	16
45	.80719	.64148	.80860	.64358	.81001	.64566	.81141	.64775	.81280	.64983	15
46	.80721	.64152	.80862	.64361	.81003	.64570	.81143	.64778	.81282	.64987	14
47	.80723	.64155	.80865	.64365	.81005	.64573	.81145	.64782	.81285	.64990	13
+ 12′	9.80726	.64159	9.80867	.64368	9.81008	.64577	9.81148	.64785	9.81287	.64994	12
49	.80728	.64162	.80869	.64372	.81010	.64580	.81150	.64789	.81289	.64997	11
50	.80730	.64166	.80872	.64375	.81012	.64584	.81152	.64792	.81292	.65001	10
51	.80733	.64169	.80874	.64378	.81015	.64587	.81155	.64796	.81294	.65004	9
+ 13′	9.80735	.64173	9.80876	.64382	9.81017	.64591	9.81157	.64799	9.81296	.65008	8
53	.80738	.64176	.80879	.64385	.81019	.64594	.81159	.64803	.81299	.65011	7
54	.80740	.64180	.80881	.64389	.81022	.64598	.81162	.64806	.81301	.65014	6
55	.80742	.64183	.80883	.64392	.81024	.64601	.81164	.64810	.81303	.65018	5
+ 14′	9.80745	.64187	9.80886	.64396	9.81026	.64605	9.81166	.64813	9.81306	.65021	4
57	.80747	.64190	.80888	.64399	.81029	.64608	.81169	.46817	.81308	.65025	3
58	.80749	.64194	.80891	.64403	.81031	.64612	.81171	.64820	.81310	.65028	2
59	.80752	.64197	.80893	.64406	.81033	.64615	.81173	.64824	.81313	.65032	1
+ 15′	9.80754	.64201	9.80895	.64410	9.81036	.64619	9.81176	.64827	9.81315	.65035	0
	$16^h\,54^m$		$16^h\,53^m$		$16^h\,52^m$		$16^h\,51^m$		$16^h\,50^m$		

TABLE 45.

Haversines.

s	$7^h\ 10^m$ 107° 30′		$7^h\ 11^m$ 107° 45′		$7^h\ 12^m$ 108° 0′		$7^h\ 13^m$ 108° 15′		$7^h\ 14^m$ 108° 30′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.81315	**.65035**	9.81454	**.65243**	9.81592	**.65451**	9.81729	**.65658**	9.81866	**.65865**	60
1	.81317	**.65039**	.81456	**.65247**	.81594	**.65454**	.81731	**.65662**	.81868	**.65869**	59
2	.81320	**.65042**	.81458	**.65250**	.81596	**.65458**	.81733	**.65665**	.81870	**.65872**	58
3	.81322	**.65046**	.81460	**.65254**	.81598	**.65461**	.81736	**.65668**	.81872	**.65876**	57
+ 1′	9.81324	**.65049**	9.81463	**.65257**	9.81601	**.65465**	9.81738	**.65672**	9.81875	**.65879**	56
5	.81326	**.65053**	.81465	**.65261**	.81603	**.65468**	.81740	**.65675**	.81877	**.65882**	55
6	.81329	**.65056**	.81467	**.65264**	.81605	**.65472**	.81743	**.65679**	.81879	**.65886**	54
7	.81331	**.65060**	.81470	**.65267**	.81608	**.65475**	.81745	**.65682**	.81882	**.65889**	53
+ 2′	9.81333	**.65063**	9.81472	**.65271**	9.81610	**.65479**	9.81747	**.65686**	9.81884	**.65893**	52
9	.81336	**.65066**	.81474	**.65274**	.81612	**.65482**	.81749	**.65689**	.81886	**.65896**	51
10	.81338	**.65070**	.81477	**.65278**	.81614	**.65485**	.81752	**.65693**	.81888	**.65900**	50
11	.81340	**.65073**	.81479	**.65281**	.81617	**.65489**	.81754	**.65696**	.81891	**.65903**	49
+ 3′	9.81343	**.65077**	9.81481	**.65285**	9.81619	**.65492**	9.81756	**.65700**	9.81893	**.65907**	48
13	.81345	**.65080**	.81483	**.65288**	.81621	**.65496**	.81759	**.65703**	.81895	**.65910**	47
14	.81347	**.65084**	.81486	**.65292**	.81624	**.65499**	.81761	**.65707**	.81897	**.65914**	46
15	.81350	**.65087**	.81488	**.65295**	.81626	**.65503**	.81763	**.65710**	.81900	**.65917**	45
+ 4′	9.81352	**.65091**	9.81490	**.65299**	9.81628	**.65506**	9.81765	**.65713**	9.81902	**.65920**	44
17	.81354	**.65094**	.81493	**.65302**	.81631	**.65510**	.81768	**.65717**	.81904	**.65924**	43
18	.81357	**.65098**	.81495	**.65306**	.81633	**.65513**	.81770	**.65720**	.81907	**.65927**	42
19	.81359	**.65101**	.81497	**.65309**	.81635	**.65516**	.81772	**.65724**	.81909	**.65931**	41
+ 5′	9.81361	**.65105**	9.81500	**.65312**	9.81637	**.65520**	9.81775	**.65727**	9.81911	**.65934**	40
21	.81364	**.65108**	.81502	**.65316**	.81640	**.65523**	.81777	**.65731**	.81913	**.65938**	39
22	.81366	**.65112**	.81505	**.65319**	.81642	**.65527**	.81779	**.65734**	.81916	**.65941**	38
23	.81368	**.65115**	.81507	**.65323**	.81644	**.65530**	.81781	**.65738**	.81918	**.65944**	37
+ 6′	9.81370	**.65118**	9.81509	**.65326**	9.81647	**.65534**	9.81784	**.65741**	9.81920	**.65948**	36
25	.81373	**.65122**	.81511	**.65330**	.81649	**.65537**	.81786	**.65744**	.81922	**.65951**	35
26	.81375	**.65125**	.81513	**.65333**	.81651	**.65541**	.81788	**.65748**	.81925	**.65955**	34
27	.81377	**.65129**	.81516	**.65337**	.81653	**.65544**	.81791	**.65751**	.81927	**.65958**	33
+ 7′	9.81380	**.65132**	9.81518	**.65340**	9.81656	**.65548**	9.81793	**.65755**	9.81929	**.65962**	32
29	.81382	**.65136**	.81520	**.65344**	.81658	**.65551**	.81795	**.65758**	.81931	**.65965**	31
30	.81384	**.65139**	.81523	**.65347**	.81660	**.65555**	.81797	**.65762**	.81934	**.65969**	30
31	.81387	**.65143**	.81525	**.65351**	.81663	**.65558**	.81800	**.65765**	.81936	**.65972**	29
+ 8′	9.81389	**.65146**	9.81527	**.65354**	9.81665	**.65561**	9.81802	**.65769**	9.81938	**.65976**	28
33	.81391	**.65150**	.81530	**.65357**	.81667	**.65565**	.81804	**.65772**	.81941	**.65979**	27
34	.81394	**.65153**	.81532	**.65361**	.81669	**.65568**	.81806	**.65776**	.81943	**.65982**	26
35	.81396	**.65157**	.81534	**.65364**	.81672	**.65572**	.81809	**.65779**	.81945	**.65986**	25
+ 9′	9.81398	**.65160**	9.81536	**.65368**	9.81674	**.65575**	9.81811	**.65782**	9.81947	**.65989**	24
37	.81400	**.65164**	.81539	**.65372**	.81676	**.65579**	.81813	**.65786**	.81950	**.65993**	23
38	.81403	**.65167**	.81541	**.65375**	.81679	**.65582**	.81816	**.65789**	.81952	**.65996**	22
39	.81405	**.65171**	.81543	**.65378**	.81681	**.65586**	.81818	**.65793**	.81954	**.66000**	21
+ 10′	9.81407	**.65174**	9.81546	**.65382**	9.81683	**.65589**	9.81820	**.65796**	9.81956	**.66003**	20
41	.81410	**.65177**	.81548	**.65385**	.81685	**.65593**	.81822	**.65800**	.81959	**.66006**	19
42	.81412	**.65181**	.81550	**.65389**	.81688	**.65596**	.81825	**.65803**	.81961	**.66010**	18
43	.81414	**.65184**	.81552	**.65392**	.81690	**.65599**	.81827	**.65807**	.81963	**.66013**	17
+ 11′	9.81417	**.65188**	9.81555	**.65396**	9.81692	**.65603**	.81829	**.65810**	9.81965	**.66017**	16
45	.81419	**.65191**	.81557	**.65399**	.81695	**.65606**	.81832	**.65813**	.81968	**.66020**	15
46	.81421	**.65195**	.81559	**.65402**	.81697	**.65610**	.81834	**.65817**	.81970	**.66024**	14
47	.81424	**.65198**	.81562	**.65406**	.81699	**.65613**	.81836	**.65820**	.81972	**.66027**	13
+ 12′	9.81426	**.65202**	9.81564	**.65409**	9.81701	**.65617**	9.81838	**.65824**	9.81975	**.66031**	12
49	.81428	**.65205**	.81566	**.65413**	.81704	**.65620**	.81841	**.65827**	.81977	**.66034**	11
50	.81430	**.65209**	.81569	**.65416**	.81706	**.65624**	.81843	**.65831**	.81979	**.66038**	10
51	.81433	**.65212**	.81571	**.65420**	.81708	**.65627**	.81845	**.65834**	.81981	**.66041**	9
+ 13′	9.81435	**.65216**	9.81573	**.65423**	9.81711	**.65630**	9.81847	**.65838**	9.81984	**.66044**	8
53	.81437	**.65219**	.81575	**.65427**	.81713	**.65634**	.81850	**.65841**	.81986	**.66048**	7
54	.81440	**.65222**	.81578	**.65430**	.81715	**.65637**	.81852	**.65845**	.81988	**.66051**	6
55	.81442	**.65226**	.81580	**.65434**	.81717	**.65641**	.81854	**.65848**	.81990	**.66055**	5
+ 14′	9.81444	**.65229**	9.81582	**.65437**	9.81720	**.65644**	9.81857	**.65851**	9.81993	**.66058**	4
57	.81447	**.65233**	.81585	**.65440**	.81722	**.55648**	.81859	**.65855**	.81995	**.66062**	3
58	.81449	**.65236**	.81587	**.65444**	.81724	**.65651**	.81861	**.65858**	.81997	**.66065**	2
59	.81451	**.65240**	.81589	**.65447**	.81727	**.65655**	.81863	**.65862**	.81999	**.66068**	1
+ 15′	9.81454	**.65243**	9.81592	**.65451**	9.81729	**.65658**	9.81866	**.65865**	9.82002	**.66072**	0
	$16^h\ 49^m$		$16^h\ 48^m$		$16^h\ 47^m$		$16^h\ 46^m$		$16^h\ 45^m$		

TABLE 45.

Haversines.

s	$7^h\ 15^m$ 108° 45′		$7^h\ 16^m$ 109° 0′		$7^h\ 17^m$ 109° 15′		$7^h\ 18^m$ 109° 30′		$7^h\ 19^m$ 109° 45′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.82002	.66072	9.82137	.66278	9.82272	.66485	9.82406	.66690	9.82540	.66896	60
1	.82004	.66075	.82139	.66282	.82274	.66488	.82409	.66694	.82542	.66899	59
2	.82006	.66079	.82142	.66285	.82277	.66491	.82411	.66697	.82544	.66903	58
3	.82009	.66082	.82144	.66289	.82279	.66495	.82413	.66701	.82547	.66906	57
+ 1′	9.82011	.66086	9.82146	.66292	9.82281	.66498	9.82415	.66704	9.82549	.66910	56
5	.82013	.66089	.82148	.66296	.82283	.66502	.82417	.66707	.82551	.66913	55
6	.82015	.66093	.82151	.66299	.82286	.66505	.82420	.66711	.82553	.66916	54
7	.82018	.66096	.82153	.66302	.82288	.66508	.82422	.66714	.82555	.66920	53
+ 2′	9.82020	.66100	9.82155	.66306	9.82290	.66512	9.82424	.66718	9.82558	.66923	52
9	.82022	.66103	.82157	.66309	.82292	.66515	.82426	.66721	.82560	.66927	51
10	.82024	.66106	.82160	.66313	.82294	.66519	.82429	.66725	.82562	.66930	50
11	.82027	.66110	.82162	.66316	.82297	.66522	.82431	.66728	.82564	.66933	49
+ 3′	9.82029	.66113	9.82164	.66320	9.82299	.66526	9.82433	.66731	9.82567	.66937	48
13	.82031	.66117	.82166	.66323	.82301	.66529	.82435	.66735	.82569	.66940	47
14	.82033	.66120	.82169	.66327	.82303	.66533	.82438	.66738	.82571	.66944	46
15	.82036	.66124	.82171	.66330	.82306	.66536	.82440	.66742	.82573	.66947	45
+ 4′	9.82038	.66127	9.82173	.66333	9.82308	.66539	9.82442	.66745	9.82575	.66951	44
17	.82040	.66130	.82175	.66337	.82310	.66543	.82444	.66749	.82578	.66954	43
18	.82042	.66134	.82178	.66340	.82312	.66546	.82446	.66752	.82580	.66957	42
19	.82045	.66137	.82180	.66344	.82315	.66550	.82449	.66755	.82582	.66961	41
+ 5′	9.82047	.66141	9.82182	.66347	9.82317	.66553	9.82451	.66759	9.82584	.66964	40
21	.82049	.66144	.82184	.66351	.82319	.66557	.82453	.66762	.82587	.66968	39
22	.82051	.66148	.82187	.66354	.82321	.66560	.82455	.66766	.82589	.66971	38
23	.82054	.66151	.82189	.66357	.82324	.66563	.82458	.66769	.82591	.66975	37
+ 6′	9.82056	.66155	9.82191	.66361	9.82326	.66567	9.82460	.66773	9.82593	.66978	36
25	.82058	.66158	.82193	.66364	.82328	.66570	.82462	.66776	.82595	.66981	35
26	.82061	.66161	.82196	.66368	.82330	.66574	.82464	.66779	.82598	.66985	34
27	.82063	.66165	.82198	.66371	.82333	.66577	.82467	.66783	.82600	.66988	33
+ 7′	9.82065	.66168	9.82200	.66375	9.82335	.66581	9.82469	.66786	9.82602	.66992	32
29	.82067	.66172	.82202	.66378	.82337	.66584	.82471	.66790	.82604	.66995	31
30	.82070	.66175	.82205	.66382	.82339	.66587	.82473	.66793	.82606	.66998	30
31	.82072	.66179	.82207	.66385	.82341	.66591	.82475	.66797	.82609	.67002	29
+ 8′	9.82074	.66182	9.82209	.66388	9.82344	.66594	9.82478	.66800	9.82611	.67005	28
33	.82076	.66186	.82211	.66392	.82346	.66598	.82480	.66803	.82613	.67009	27
34	.82079	.66189	.82214	.66395	.82348	.66601	.82482	.66807	.82615	.67012	26
35	.82081	.66192	.82216	.66399	.82350	.66605	.82484	.66810	.82618	.67016	25
+ 9′	9.82083	.66196	9.82218	.66402	9.82353	.66608	9.82487	.66814	9.82620	.67019	24
37	.82085	.66199	.82220	.66406	.82355	.66611	.82489	.66817	.82622	.67022	23
38	.82088	.66203	.82223	.66409	.82357	.66615	.82491	.66821	.82624	.67026	22
39	.82090	.66206	.82225	.66412	.82359	.66618	.82493	.66824	.82627	.67029	21
+ 10′	9.82092	.66210	9.82227	.66416	9.82362	.66622	9.82495	.66827	9.82629	.67033	20
41	.82094	.66213	.82229	.66419	.82364	.66625	.82498	.66831	.82631	.67036	19
42	.82097	.66217	.82232	.66423	.82366	.66629	.82500	.66834	.82633	.67039	18
43	.82099	.66220	.82234	.66426	.82368	.66632	.82502	.66838	.82635	.67043	17
+ 11′	9.82101	.66223	9.82236	.66430	9.82371	.66635	9.82504	.66841	9.82638	.67046	16
45	.82103	.66227	.82238	.66433	.82373	.66639	.82507	.66844	.82640	.67050	15
46	.82106	.66230	.82241	.66436	.82375	.66642	.82509	.66848	.82642	.67053	14
47	.82108	.66234	.82243	.66440	.82377	.66646	.82511	.66851	.82644	.67057	13
+ 12′	9.82110	.66237	9.82245	.66443	9.82380	.66649	9.82513	.66855	9.82646	.67060	12
49	.82112	.66241	.82247	.66447	.82382	.66653	.82515	.66858	.82649	.67063	11
50	.82115	.66244	.82250	.66450	.82384	.66656	.82518	.66862	.82651	.67067	10
51	.82117	.66247	.82252	.66454	.82386	.66659	.82520	.66865	.82653	.67070	9
+ 13′	9.82119	.66251	9.82254	.66457	9.82388	.66663	9.82522	.66868	9.82655	.67074	8
53	.82121	.66254	.82256	.66460	.82391	.66666	.82524	.66872	.82657	.67077	7
54	.82124	.66258	.82259	.66464	.82393	.66670	.82527	.66875	.82660	.67081	6
55	.82126	.66261	.82261	.66467	.82395	.66673	.82529	.66879	.82662	.67084	5
+ 14′	9.82128	.66265	9.82263	.66471	9.82397	.66677	9.82531	.66882	9.82664	.67087	4
57	.82130	.66268	.82265	.66474	.82400	.66680	.82533	.66886	.82666	.67091	3
58	.82133	.66272	.82268	.66478	.82402	.66683	.82535	.66889	.82668	.67094	2
59	.82135	.66275	.82270	.66481	.82404	.66687	.82538	.66892	.82671	.67098	1
+ 15′	9.82137	.66278	9.82272	.66485	9.82406	.66690	9.82540	.66896	9.82673	.67101	0
	$16^h\ 44^m$		$16^h\ 43^m$		$16^h\ 42^m$		$16^h\ 41^m$		$16^h\ 40^m$		

TABLE 45.

Haversines.

	$7^h\ 20^m$ 110° 0′		$7^h\ 21^m$ 110° 15′		$7^h\ 22^m$ 110° 30′		$7^h\ 23^m$ 110° 45′		$7^h\ 24^m$ 111° 0′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.82673	.67101	9.82805	.67306	9.82937	.67510	9.83068	.67715	9.83199	.67918	60
1	.82675	.67104	.82807	.67309	.82939	.67514	.83070	.67718	.83201	.67922	59
2	.82677	.67108	.82810	.67313	.82941	.67517	.83073	.67721	.83203	.67925	58
3	.82680	.67111	.82812	.67316	.82944	.67521	.83075	.67725	.83205	.67929	57
+ 1′	9.82682	.67115	9.82814	.67320	9.82946	.67524	9.83077	.67728	9.83207	.67932	56
5	.82684	.67118	.82816	.67323	.82948	.67527	.83079	.67732	.83210	.67935	55
6	.82686	.67122	.82818	.67326	.82950	.67531	.83081	.67735	.83212	.67939	54
7	.82688	.67125	.82821	.67330	.82952	.67534	.83083	.67738	.83214	.67942	53
+ 2′	9.82691	.67128	9.82823	.67333	9.82955	.67538	9.83086	.67742	9.83216	.67946	52
9	.82693	.67132	.82825	.67337	.82957	.67541	.83088	.67745	.83218	.67949	51
10	.82695	.67135	.82827	.67340	.82959	.67544	.83090	.67749	.83220	.67952	50
11	.82697	.67139	.82829	.67343	.82961	.67548	.83092	.67752	.83223	.67956	49
+ 3′	9.82699	.67142	9.82832	.67347	9.82963	.67551	9.83094	.67755	9.83225	.67959	48
13	.82702	.67145	.82834	.67350	.82966	.67555	.83097	.67759	.83227	.67963	47
14	.82704	.67149	.82836	.67354	.82968	.67558	.83099	.67762	.83229	.67966	46
15	.82706	.67152	.82838	.67357	.82970	.67561	.83101	.67766	.83231	.67969	45
+ 4′	9.82708	.67156	9.82840	.67360	9.82972	.67565	9.83103	.67769	9.83233	.67973	44
17	.82710	.67159	.82843	.67364	.82974	.67568	.83105	.67772	.83236	.67976	43
18	.82713	.67163	.82845	.67367	.82976	.67572	.83107	.67776	.83238	.67979	42
19	.82715	.67166	.82847	.67371	.82979	.67575	.83110	.67779	.83240	.67983	41
+ 5′	9.82717	.67169	9.82849	.67374	9.82981	.67578	9.83112	.67783	9.83242	.67986	40
21	.82719	.67173	.82851	.67377	.82983	.67582	.83114	.67786	.83244	.67990	39
22	.82722	.67176	.82854	.67381	.82985	.67585	.83116	.67789	.83246	.67993	38
23	.82724	.67180	.82856	.67384	.82987	.67589	.83118	.67793	.83249	.67996	37
+ 6′	9.82726	.67183	9.82858	.67388	9.82990	.67592	9.83120	.67796	9.83251	.68000	36
25	.82728	.67186	.82860	.67391	.82992	.67595	.83123	.67800	.83253	.68003	35
26	.82730	.67190	.82862	.67395	.82994	.67599	.83125	.67803	.83255	.68007	34
27	.82733	.67193	.82865	.67398	.82996	.67602	.83127	.67806	.83257	.68010	33
+ 7′	9.82735	.67197	9.82867	.67401	9.82998	.67606	9.83129	.67810	9.83259	.68013	32
29	.82737	.67200	.82869	.67405	.83001	.67609	.83131	.67813	.83262	.68017	31
30	.82739	.67203	.82871	.67408	.83003	.67613	.83134	.67817	.83264	.68020	30
31	.82741	.67207	.82873	.67412	.83005	.67616	.83136	.67820	.83266	.68024	29
+ 8′	9.82744	.67210	9.82876	.67415	9.83007	.67619	9.83138	.67823	9.83268	.68027	28
33	.82746	.67214	.82878	.67418	.83009	.67623	.83140	.67827	.83270	.68030	27
34	.82748	.67217	.82880	.67422	.83011	.67626	.83142	.67830	.83272	.68034	26
35	.82750	.67221	.82882	.67425	.83014	.67630	.83144	.67834	.83275	.68037	25
+ 9′	9.82752	.67224	9.82884	.67429	9.83016	.67633	9.83147	.67837	9.83277	.68041	24
37	.82755	.67227	.82887	.67432	.83018	.67636	.83149	.67840	.83279	.68044	23
38	.82757	.67231	.82889	.67435	.83020	.67640	.83151	.67844	.83281	.68047	22
39	.82759	.67234	.82891	.67439	.83022	.67643	.83153	.67847	.83283	.68051	21
+ 10′	9.82761	.67238	9.82893	.67442	9.83025	.67647	9.83155	.67850	9.83285	.68054	20
41	.82763	.67241	.82895	.67446	.83027	.67650	.83157	.67854	.83288	.68058	19
42	.82766	.67244	.82898	.67449	.83029	.67653	.83160	.67857	.83290	.68061	18
43	.82768	.67248	.82900	.67452	.83031	.67657	.83162	.67861	.83292	.68064	17
+ 11′	9.82770	.67251	9.82902	.67456	9.83033	.67660	9.83164	.67864	9.83294	.68068	16
45	.82772	.67255	.82904	.67459	.83035	.67664	.83166	.67868	.83296	.68071	15
46	.82774	.67258	.82906	.67463	.83038	.67667	.83168	.67871	.83298	.68074	14
47	.82777	.67261	.82909	.67466	.83040	.67670	.83170	.67874	.83301	.68078	13
+ 12′	9.82779	.67265	9.82911	.67469	9.83042	.67674	9.83173	.67878	9.83303	.68081	12
49	.82781	.67268	.82913	.67473	.83044	.67677	.83175	.67881	.83305	.68085	11
50	.82783	.67272	.82915	.67476	.83046	.67681	.83177	.67884	.83307	.68088	10
51	.82785	.67275	.82917	.67480	.83049	.67684	.83179	.67888	.83309	.68091	9
+ 13′	9.82788	.67279	9.82920	.67483	9.83051	.67687	9.83181	.67891	9.83311	.68095	8
53	.82790	.67282	.82922	.67487	.83053	.67691	.83184	.67895	.83314	.68098	7
54	.82792	.67285	.82924	.67490	.83055	.67694	.83186	.67898	.83316	.68102	6
55	.82794	.67289	.82926	.67493	.83057	.67698	.83188	.67901	.83318	.68105	5
+ 14′	9.82796	.67292	9.82928	.67497	9.83059	.67701	9.83190	.67905	9.83320	.68108	4
57	.82799	.67296	.82930	.67500	.83062	.67704	.83192	.67908	.83322	.68112	3
58	.82801	.67299	.82933	.67504	.83064	.67708	.83194	.67912	.83324	.68115	2
59	.82803	.67302	.82935	.67507	.83066	.67711	.83197	.67915	.83327	.68119	1
+ 15′	9.82805	.67306	9.82937	.67510	9.83068	.67715	9.83199	.67918	9.83329	.68122	0
	$16^h\ 39^m$		$16^h\ 38^m$		$16^h\ 37^m$		$16^h\ 36^m$		$16^h\ 35^m$		

TABLE 45.

Haversines.

	$7^h\,25^m$ 111° 15′		$7^h\,26^m$ 111° 30′		$7^h\,27^m$ 111° 45′		$7^h\,28^m$ 112° 0′		$7^h\,29^m$ 112° 15′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.83329	.68122	9.83458	.68325	9.83587	.68528	9.83715	.68730	9.83842	.68932	60
1	.83331	.68125	.83460	.68328	.83589	.68531	.83717	.68734	.83844	.68936	59
2	.83333	.68129	.83462	.68332	.83591	.68535	.83719	.68737	.83847	.68939	58
3	.83335	.68132	.83464	.68335	.83593	.68538	.83721	.68740	.83849	.68943	57
+ 1′	9.83337	.68135	9.83467	.68339	9.83595	.68541	9.83723	.68744	9.83851	.68946	56
5	.83339	.68139	.83469	.68342	.83597	.68545	.83725	.68747	.83853	.68949	55
6	.83342	.68142	.83471	.68345	.83600	.68548	.83728	.68751	.83855	.68953	54
7	.83344	.68146	.83473	.68349	.83602	.68552	.83730	.68754	.83857	.68956	53
+ 2′	9.83346	.68149	9.83475	.68352	9.83604	.68555	9.83732	.68757	9.83859	.68959	52
9	.83348	.68152	.83477	.68356	.83606	.68558	.83734	.68761	.83861	.68963	51
10	.83350	.68156	.83480	.68359	.83608	.68562	.83736	.68764	.83864	.68966	50
11	.83352	.68159	.83482	.68362	.83610	.68565	.83738	.68767	.83866	.68969	49
+ 3′	9.83355	.68163	9.83484	.68366	9.83612	.68568	9.83740	.68771	9.83868	.68973	48
13	.83357	.68166	.83486	.68369	.83615	.68572	.83743	.68774	.83870	.68976	47
14	.83359	.68169	.83488	.68372	.83617	.68575	.83745	.68778	.83872	.68980	46
15	.83361	.68173	.83490	.68376	.83619	.68579	.83747	.68781	.83874	.68983	45
+ 4′	9.83363	.68176	9.83492	.68379	9.83621	.68582	9.83749	.68784	9.83876	.68986	44
17	.83365	.68180	.83495	.68383	.83623	.68585	.83751	.68788	.83878	.68990	43
18	.83368	.68183	.83497	.68386	.83625	.68589	.83753	.68791	.83881	.68993	42
19	.83370	.68186	.83499	.68389	.83627	.68592	.83755	.68794	.83883	.68996	41
+ 5′	9.83372	.68190	9.83501	.68393	9.83630	.68595	9.83757	.68798	9.83885	.69000	40
21	.83374	.68193	.83503	.68396	.83632	.68599	.83760	.68801	.83887	.69003	39
22	.83376	.68196	.83505	.68399	.83634	.68602	.83762	.68804	.83889	.69006	38
23	.83378	.68200	.83507	.68403	.83636	.68606	.83764	.68808	.83891	.69010	37
+ 6′	9.83380	.68203	9.83510	.68406	9.83638	.68609	9.83766	.68811	9.83893	.69013	36
25	.83383	.68207	.83512	.68410	.83640	.68612	.83768	.68815	.83895	.69017	35
26	.83385	.68210	.83514	.68413	.83642	.68616	.83770	.68818	.83897	.69020	34
27	.83387	.68213	.83516	.68416	.83644	.68619	.83772	.68821	.83900	.69023	33
+ 7′	9.83389	.68217	9.83518	.68420	9.83647	.68622	9.83774	.68825	9.83902	.69027	32
29	.83391	.68220	.83520	.68423	.83649	.68626	.83777	.68828	.83904	.69030	31
30	.83393	.68224	.83522	.68427	.83651	.68629	.83779	.68831	.83906	.69033	30
31	.83396	.68227	.83525	.68430	.83653	.68633	.83781	.68835	.83908	.69037	29
+ 8′	9.83398	.68230	9.83527	.68433	9.83655	.68636	9.83783	.68838	9.83910	.69040	28
33	.83400	.68234	.83529	.68437	.83657	.68639	.83785	.68842	.83912	.69044	27
34	.83402	.68237	.83531	.68440	.83659	.68643	.83787	.68845	.83914	.69047	26
35	.83404	.68240	.83533	.68443	.83662	.68646	.83789	.68848	.83916	.69050	25
+ 9′	9.83406	.68244	9.83535	.68447	9.83664	.68649	9.83791	.68852	9.83919	.69054	24
37	.83409	.68247	.83537	.68450	.83666	.68653	.83794	.68855	.83921	.69057	23
38	.83411	.68251	.83540	.68454	.83668	.68656	.83796	.68858	.83923	.69060	22
39	.83413	.68254	.83542	.68457	.83670	.68660	.83798	.68862	.83925	.69064	21
+ 10′	9.83415	.68257	9.83544	.68460	9.83672	.68663	9.83800	.68865	9.83927	.69067	20
41	.83417	.68261	.83546	.68464	.83674	.68666	.83802	.68869	.83929	.69070	19
42	.83419	.68264	.83548	.68467	.83676	.68670	.83804	.68872	.83931	.69074	18
43	.83421	.68268	.83550	.68470	.83679	.68673	.83806	.68875	.83933	.69077	17
+ 11′	9.83424	.68271	9.83552	.68474	9.83681	.68676	9.83808	.68879	9.83935	.69080	16
45	.83426	.68274	.83555	.68477	.83683	.68680	.83811	.68882	.83938	.69084	15
46	.83428	.68278	.83557	.68481	.83685	.68683	.83813	.68885	.83940	.69087	14
47	.83430	.68281	.83559	.68484	.83687	.68687	.83815	.68889	.83942	.69091	13
+ 12′	9.83432	.68284	9.83561	.68487	9.83689	.68690	9.83817	.68892	9.83944	.69094	12
49	.83434	.68288	.83563	.68491	.83691	.68693	.83819	.68895	.83946	.69097	11
50	.83436	.68291	.83565	.68494	.83694	.68697	.83821	.68899	.83948	.69101	10
51	.83439	.68295	.83567	.68497	.83696	.68700	.83823	.68902	.83950	.69104	9
+ 13′	9.83441	.68298	9.83570	.68501	9.83698	.68703	9.83825	.68906	9.83952	.69107	8
53	.83443	.68301	.83572	.68504	.83700	.68707	.83828	.68909	.83955	.69111	7
54	.83445	.68305	.83574	.68508	.83702	.68710	.83830	.68912	.83957	.69114	6
55	.83447	.68308	.83576	.68511	.83704	.68713	.83832	.68916	.83959	.69117	5
+ 14′	9.83449	.68312	9.83578	.68515	9.83706	.68717	9.83834	.68919	9.83961	.69121	4
57	.83452	.68315	.83580	.68518	.83708	.68720	.83836	.68922	.83963	.69124	3
58	.83454	.68318	.83582	.68521	.83711	.68724	.83838	.68926	.83965	.69127	2
59	.83456	.68322	.83585	.68525	.83713	.68727	.83840	.68929	.83967	.69131	1
+ 15′	9.83458	.68325	9.83587	.68528	9.83715	.68730	9.83842	.68932	9.83969	.69134	0
	$16^h\,34^m$		$16^h\,33^m$		$16^h\,32^m$		$16^h\,31^m$		$16^h\,30^m$		

TABLE 45.

Haversines.

	$7^h\ 30^m$ 112° 30′		$7^h\ 31^m$ 112° 45′		$7^h\ 32^m$ 113° 0′		$7^h\ 33^m$ 113° 15′		$7^h\ 34^m$ 113° 30′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.83969	**.69134**	9.84096	**.69336**	9.84221	**.69537**	9.84346	**.69737**	9.84471	**.69937**	60
1	.83971	**.69138**	.84098	**.69339**	.84223	**.69540**	.84349	**.69741**	.84473	**.69941**	59
2	.83974	**.69141**	.84100	**.69342**	.84226	**.69543**	.84351	**.69744**	.84475	**.69944**	58
3	.83976	**.69144**	.84102	**.69346**	.84228	**.69547**	.84353	**.69747**	.84477	**.69947**	57
+ 1′	9.83978	**.69148**	9.84104	**.69349**	9.84230	**.69550**	9.84355	**.69751**	9.84479	**.69951**	56
5	.83980	**.69151**	.84106	**.69352**	.84232	**.69553**	.84357	**.69754**	.84481	**.69954**	55
6	.83982	**.69154**	.84108	**.69356**	.84234	**.69557**	.84359	**.69757**	.84483	**.69957**	54
7	.83984	**.69158**	.84110	**.69359**	.84236	**.69560**	.84361	**.69761**	.84485	**.69961**	53
+ 2′	9.83986	**.69161**	9.84112	**.69362**	9.84238	**.69563**	9.84363	**.69764**	9.84488	**.69964**	52
9	.83988	**.69164**	.84114	**.69366**	.84240	**.69567**	.84365	**.69767**	.84490	**.69967**	51
10	.83990	**.69168**	.84117	**.69369**	.84242	**.69570**	.84367	**.69771**	.84492	**.69971**	50
11	.83992	**.69171**	.84119	**.69372**	.84244	**.69573**	.84369	**.69774**	.84494	**.69974**	49
+ 3′	9.83995	**.69174**	9.84121	**.69376**	9.84246	**.69577**	9.84371	**.69777**	9.84496	**.69977**	48
13	.83997	**.69178**	.84123	**.69379**	.84248	**.69580**	.84373	**.69781**	.84498	**.69981**	47
14	.83999	**.69181**	.84125	**.69382**	.84251	**.69583**	.84376	**.69784**	.84500	**.69984**	46
15	.84001	**.69185**	.84127	**.69386**	.84253	**.69587**	.84378	**.69787**	.84502	**.69987**	45
+ 4′	9.84003	**.69188**	9.84129	**.69389**	9.84255	**.69590**	9.84380	**.69791**	9.84504	**.69991**	44
17	.84005	**.69191**	.84131	**.69393**	.84257	**.69593**	.84382	**.69794**	.84506	**.69994**	43
18	.84007	**.69195**	.84133	**.69396**	.84259	**.69597**	.84384	**.69797**	.84508	**.69997**	42
19	.84009	**.69198**	.84135	**.69399**	.84261	**.69600**	.84386	**.69801**	.84510	**.70001**	41
+ 5′	9.84011	**.69201**	9.84138	**.69403**	9.84263	**.69603**	9.84388	**.69804**	9.84512	**.70004**	40
21	.84014	**.69205**	.84140	**.69406**	.84265	**.69607**	.84390	**.69807**	.84514	**.70007**	39
22	.84016	**.69208**	.84142	**.69409**	.84267	**.69610**	.84392	**.69811**	.84517	**.70011**	38
23	.84018	**.69211**	.84144	**.69413**	.84269	**.69614**	.84394	**.69814**	.84519	**.70014**	37
+ 6′	9.84020	**.69215**	9.84146	**.69416**	9.84271	**.69617**	9.84396	**.69817**	9.84521	**.70017**	36
25	.84022	**.69218**	.84148	**.69419**	.84274	**.69620**	.84398	**.69821**	.84523	**.70021**	35
26	.84024	**.69221**	.84150	**.69423**	.84276	**.69624**	.84400	**.69824**	.84525	**.70024**	34
27	.84026	**.69225**	.84152	**.69426**	.84278	**.69627**	.84403	**.69827**	.84527	**.70027**	33
+ 7′	9.84028	**.69228**	9.84154	**.69429**	9.84280	**.69630**	9.84405	**.69831**	9.84529	**.70031**	32
29	.84030	**.69232**	.84156	**.69433**	.84282	**.69634**	.84407	**.69834**	.84531	**.70034**	31
30	.84033	**.69235**	.84159	**.69436**	.84284	**.69637**	.84409	**.69837**	.84533	**.70037**	30
31	.84035	**.69238**	.84161	**.69439**	.84286	**.69640**	.84411	**.69841**	.84535	**.70041**	29
+ 8′	9.84037	**.69242**	9.84163	**.69443**	9.84288	**.69644**	9.84413	**.69844**	9.84537	**.70044**	28
33	.84039	**.69245**	.84165	**.69446**	.84290	**.69647**	.84415	**.69847**	.84539	**.70047**	27
34	.84041	**.69248**	.84167	**.69450**	.84292	**.69650**	.84417	**.69851**	.84541	**.70051**	26
35	.84043	**.69252**	.84169	**.69453**	.84294	**.69654**	.84419	**.69854**	.84543	**.70054**	25
+ 9′	9.84045	**.69255**	9.84171	**.69456**	9.84296	**.69657**	9.84421	**.69857**	9.84545	**.70057**	24
37	.84047	**.69258**	.84173	**.69460**	.84299	**.69660**	.84423	**.69861**	.84547	**.70061**	23
38	.84049	**.69262**	.84175	**.69463**	.84301	**.69664**	.84425	**.69864**	.84550	**.70064**	22
39	.84051	**.69265**	.84177	**.69466**	.84303	**.69667**	.84427	**.69867**	.84552	**.70067**	21
+ 10′	9.84054	**.69268**	9.84179	**.69470**	9.84305	**.69670**	9.84430	**.69871**	9.84554	**.70071**	20
41	.84056	**.69272**	.84182	**.69473**	.84307	**.69674**	.84432	**.69874**	.84556	**.70074**	19
42	.84058	**.69275**	.84184	**.69476**	.84309	**.69677**	.84434	**.69877**	.84558	**.70077**	18
43	.84060	**.69279**	.84186	**.69480**	.84311	**.69680**	.84436	**.69381**	.84560	**.70081**	17
+ 11′	9.84062	**.69282**	9.84188	**.69483**	9.84313	**.69684**	9.84438	**.69884**	9.84562	**.70084**	16
45	.84064	**.69285**	.84190	**.69486**	.84315	**.69687**	.84440	**.69887**	.84564	**.70087**	15
46	.84066	**.69289**	.84192	**.69490**	.84317	**.69690**	.84442	**.69891**	.84566	**.70091**	14
47	.84068	**.69292**	.84194	**.69493**	.84319	**.69694**	.84444	**.69894**	.84568	**.70094**	13
+ 12′	9.84070	**.69295**	9.84196	**.69496**	9.84321	**.69697**	9.84446	**.69397**	9.84570	**.70097**	12
49	.84072	**.69299**	.84198	**.69500**	.84324	**.69700**	.84448	**.69901**	.84572	**.70101**	11
50	.84075	**.69302**	.84200	**.69503**	.84326	**.69704**	.84450	**.69904**	.84574	**.70104**	10
51	.84077	**.69305**	.84203	**.69506**	.84328	**.69707**	.84452	**.69907**	.84576	**.70107**	9
+ 13′	9.84079	**.69309**	9.84205	**.69510**	9.84330	**.69710**	9.84454	**.69911**	9.84578	**.70111**	8
53	.84081	**.69312**	.84207	**.69513**	.84332	**.69714**	.84456	**.69914**	.84581	**.70114**	7
54	.84083	**.69315**	.84209	**.69516**	.84334	**.69717**	.84459	**.69917**	.84583	**.70117**	6
55	.84085	**.69319**	.84211	**.69520**	.84336	**.69720**	.84461	**.69921**	.84585	**.70121**	5
+ 14′	9.84087	**.69322**	9.84213	**.69523**	9.84338	**.69724**	9.84463	**.69924**	9.84587	**.70124**	4
57	.84089	**.69326**	.84215	**.69527**	.84340	**.69727**	.84465	**.69927**	.84589	**.70127**	3
58	.84091	**.69329**	.84217	**.69530**	.84342	**.69731**	.84467	**.69931**	.84591	**.70131**	2
59	.84093	**.69332**	.84219	**.69533**	.84344	**.69734**	.84469	**.69934**	.84593	**.70134**	1
+ 15′	9.84096	**.69336**	9.84221	**.69537**	9.84346	**.69737**	9.84471	**.69937**	9.84595	**.70137**	0
	$16^h\ 29^m$		$16^h\ 28^m$		$16^h\ 27^m$		$16^h\ 26^m$		$16^h\ 25^m$		

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TABLE 45.

Haversines.

s	$7^h\ 35^m$ 113° 45′		$7^h\ 36^m$ 114° 0′		$7^h\ 37^m$ 114° 15′		$7^h\ 38^m$ 114° 30′		$7^h\ 39^m$ 114° 45′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.84595	**.70137**	9.84718	**.70337**	9.84841	**.70536**	9.84963	**.70735**	9.85085	**.70933**	60
1	.84597	**.70141**	.84720	**.70340**	.84843	**.70539**	.84965	**.70738**	.85087	**.70936**	59
2	.84599	**.70144**	.84722	**.70343**	.84845	**.70543**	.84967	**.70741**	.85089	**.70940**	58
3	.84601	**.70147**	.84724	**.70347**	.84847	**.70546**	.84969	**.70745**	.85091	**.70943**	57
+ 1′	9.84603	**.70151**	9.84726	**.70350**	9.84849	**.70549**	9.84971	**.70748**	9.85093	**.70946**	56
5	.84605	**.70154**	.84729	**.70353**	.84851	**.70553**	.84973	**.70751**	.85095	**.70950**	55
6	.84607	**.70157**	.84731	**.70357**	.84853	**.70556**	.84975	**.70755**	.85097	**.70953**	54
7	.84609	**.70161**	.84733	**.70360**	.84855	**.70559**	.84977	**.70758**	.85099	**.70956**	53
+ 2′	9.84611	**.70164**	9.84735	**.70363**	9.84857	**.70562**	9.84979	**.70761**	9.85101	**.70959**	52
9	.84613	**.70167**	.84737	**.70367**	.84859	**.70566**	.84982	**.70764**	.85103	**.70963**	51
10	.84616	**.70171**	.84739	**.70370**	.84861	**.70569**	.84984	**.70768**	.85105	**.70966**	50
11	.84618	**.70174**	.84741	**.70373**	.84863	**.70572**	.84986	**.70771**	.85107	**.70969**	49
+ 3′	9.84620	**.70177**	9.84743	**.70377**	9.84866	**.70576**	9.84988	**.70774**	9.85109	**.70973**	48
13	.84622	**.70181**	.84745	**.70380**	.84868	**.70579**	.84990	**.70778**	.85111	**.70976**	47
14	.84624	**.70184**	.84747	**.70383**	.84870	**.70582**	.84992	**.70781**	.85113	**.70979**	46
15	.84626	**.70187**	.84749	**.70387**	.84872	**.70586**	.84994	**.70784**	.85115	**.70983**	45
+ 4′	9.84628	**.70191**	9.84751	**.70390**	9.84874	**.70589**	9.84996	**.70788**	9.85117	**.70986**	44
17	.84630	**.70194**	.84753	**.70393**	.84876	**.70592**	.84998	**.70791**	.85119	**.70989**	43
18	.84632	**.70197**	.84755	**.70397**	.84878	**.70596**	.85000	**.70794**	.85121	**.70992**	42
19	.84634	**.70201**	.84757	**.70400**	.84880	**.70599**	.85002	**.70798**	.85123	**.70996**	41
+ 5′	9.84636	**.70204**	9.84759	**.70403**	9.84882	**.70602**	9.85004	**.70801**	9.85125	**.70999**	40
21	.84638	**.70207**	.84761	**.70407**	.84884	**.70606**	.85006	**.70804**	.85127	**.71002**	39
22	.84640	**.70211**	.84763	**.70410**	.84886	**.70609**	.85008	**.70807**	.85129	**.71006**	38
23	.84642	**.70214**	.84765	**.70413**	.84888	**.70612**	.85010	**.70811**	.85131	**.71009**	37
+ 6′	9.84644	**.70217**	9.84767	**.70417**	9.84890	**.70615**	9.85012	**.70814**	9.85133	**.71012**	36
25	.84646	**.70221**	.84770	**.70420**	.84892	**.70619**	.85014	**.70817**	.85135	**.71016**	35
26	.84648	**.70224**	.84772	**.70423**	.84894	**.70622**	.85016	**.70821**	.85137	**.71019**	34
27	.84651	**.70227**	.84774	**.70426**	.84896	**.70625**	.85018	**.70824**	.85139	**.71022**	33
+ 7′	9.84653	**.70230**	9.84776	**.70430**	9.84898	**.70629**	9.85020	**.70827**	9.85141	**.71025**	32
29	.84655	**.70234**	.84778	**.70433**	.84900	**.70632**	.85022	**.70831**	.85143	**.71029**	31
30	.84657	**.70237**	.84780	**.70436**	.84902	**.70635**	.85024	**.70834**	.85145	**.71032**	30
31	.84659	**.70240**	.84782	**.70440**	.84904	**.70639**	.85026	**.70837**	.85147	**.71035**	29
+ 8′	9.84661	**.70244**	9.84784	**.70443**	9.84906	**.70642**	9.85028	**.70840**	9.85149	**.71039**	28
33	.84663	**.70247**	.84786	**.70446**	.84908	**.70645**	.85030	**.70844**	.85151	**.71042**	27
34	.84665	**.70250**	.84788	**.70450**	.84910	**.70649**	.85032	**.70847**	.85153	**.71045**	26
35	.84667	**.70254**	.84790	**.70453**	.84912	**.70652**	.85034	**.70850**	.85155	**.71049**	25
+ 9′	9.84669	**.70257**	9.84792	**.70456**	9.84914	**.70655**	9.85036	**.70854**	9.85158	**.71052**	24
37	.84671	**.70260**	.84794	**.70460**	.84916	**.70659**	.85038	**.70857**	.85160	**.71055**	23
38	.84673	**.70264**	.84796	**.70463**	.84919	**.70662**	.85040	**.70860**	.85162	**.71058**	22
39	.84675	**.70267**	.84798	**.70466**	.84921	**.70665**	.85042	**.70864**	.85164	**.71062**	21
+ 10′	9.84677	**.70270**	9.84800	**.70470**	9.84923	**.70668**	9.85044	**.70867**	9.85166	**.71065**	20
41	.84679	**.70274**	.84802	**.70473**	.84925	**.70672**	.85046	**.70870**	.85168	**.71068**	19
42	.84681	**.70277**	.84804	**.70476**	.84927	**.70675**	.85048	**.70874**	.85170	**.71072**	18
43	.84683	**.70280**	.84806	**.70480**	.84929	**.70678**	.85050	**.70877**	.85172	**.71075**	17
+ 11′	9.84685	**.70284**	9.84808	**.70483**	9.84931	**.70682**	9.85052	**.70880**	9.85174	**.71078**	16
45	.84688	**.70287**	.84810	**.70486**	.84933	**.70685**	.85054	**.70884**	.85176	**.71082**	15
46	.84690	**.70290**	.84812	**.70490**	.84935	**.70688**	.85057	**.70887**	.85178	**.71085**	14
47	.84692	**.70294**	.84815	**.70493**	.84937	**.70692**	.85059	**.70890**	.85180	**.71088**	13
+ 12′	9.84694	**.70297**	9.84817	**.70496**	9.84939	**.70695**	9.85061	**.70893**	9.85182	**.71091**	12
49	.84696	**.70300**	.84819	**.70499**	.84941	**.70698**	.85063	**.70897**	.85184	**.71095**	11
50	.84698	**.70304**	.84821	**.70503**	.84943	**.70702**	.85065	**.70900**	.85186	**.71098**	10
51	.84700	**.70307**	.84823	**.70506**	.84945	**.70705**	.85067	**.70903**	.85188	**.71101**	9
+ 13′	9.84702	**.70310**	9.84825	**.70509**	9.84947	**.70708**	9.85069	**.70907**	9.85190	**.71105**	8
53	.84704	**.70314**	.84827	**.70513**	.84949	**.70712**	.85071	**.70910**	.85192	**.71108**	7
54	.84706	**.70317**	.84829	**.70516**	.84951	**.70715**	.85073	**.70913**	.85194	**.71111**	6
55	.84708	**.70320**	.84831	**.70519**	.84953	**.70718**	.85075	**.70916**	.85196	**.71114**	5
+ 14′	9.84710	**.70324**	9.84833	**.70523**	9.84955	**.70721**	9.85077	**.70920**	9.85198	**.71118**	4
57	.84712	**.70327**	.84835	**.70526**	.84957	**.70725**	.85079	**.70923**	.85200	**.71121**	3
58	.84714	**.70330**	.84837	**.70529**	.84959	**.70729**	.85081	**.70926**	.85202	**.71124**	2
59	.84716	**.70333**	.84839	**.70533**	.84961	**.70731**	.85083	**.70930**	.85204	**.71128**	1
+ 15′	9.84718	**.70337**	9.84841	**.70536**	9.84963	**.70735**	9.85085	**.70933**	9.85206	**.71131**	0
	$16^h\ 24^m$		$16^h\ 23^m$		$16^h\ 22^m$		$16^h\ 21^m$		$16^h\ 20^m$		

TABLE 45.

Haversines.

	$7^h 40^m$ **115° 0′**		$7^h 41^m$ **115° 30′**		$7^h 42^m$ **115° 30′**		$7^h 43^m$ **115° 45′**		$7^h 44^m$ **116° 0′**		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.85206	**.71131**	9.85326	**.71328**	9.85446	**.71526**	9.85565	**.71722**	9.85684	**.71919**	60
1	.85208	**.71134**	.85328	**.71332**	.85448	**.71529**	.85567	**.71726**	.85686	**.71922**	59
2	.85210	**.71138**	.85330	**.71335**	.85450	**.71532**	.85569	**.71729**	.85688	**.71925**	58
3	.85212	**.71141**	.85332	**.71338**	.85452	**.71535**	.85571	**.71732**	.85690	**.71928**	57
+ **1′**	9.85214	**.71144**	9.85334	**.71342**	9.85454	**.71539**	9.85573	**.71735**	9.85692	**.71932**	56
5	.85216	**.71147**	.85336	**.71345**	.85456	**.71542**	.85575	**.71739**	.85694	**.71935**	55
6	.85218	**.71151**	.85338	**.71348**	.85458	**.71545**	.85577	**.71742**	.85696	**.71938**	54
7	.85220	**.71154**	.85340	**.71351**	.85460	**.71549**	.85579	**.71745**	.85698	**.71941**	53
+ **2′**	9.85222	**.71157**	9.85342	**.71355**	9.85462	**.71552**	9.85581	**.71748**	9.85700	**.71945**	52
9	.85224	**.71161**	.85344	**.71358**	.85464	**.71555**	.85583	**.71752**	.85702	**.71948**	51
10	.85226	**.71164**	.85346	**.71361**	.85466	**.71558**	.85585	**.71755**	.85704	**.71951**	50
11	.85228	**.71167**	.85348	**.71365**	.85468	**.71562**	.85587	**.71758**	.85706	**.71955**	49
+ **3′**	9.85230	**.71170**	9.85350	**.71368**	9.85470	**.71565**	9.85589	**.71762**	9.85708	**.71958**	48
13	.85232	**.71174**	.85352	**.71371**	.85472	**.71568**	.85591	**.71765**	.85710	**.71961**	47
14	.85234	**.71177**	.85354	**.71374**	.85474	**.71571**	.85593	**.71768**	.85712	**.71964**	46
15	.85236	**.71180**	.85356	**.71378**	.85476	**.71575**	.85595	**.71771**	.85714	**.71968**	45
+ **4′**	9.85238	**.71184**	9.85358	**.71381**	9.85478	**.71578**	9.85597	**.71775**	9.85716	**.71971**	44
17	.85240	**.71187**	.85360	**.71384**	.85480	**.71581**	.85599	**.71778**	.85718	**.71974**	43
18	.85242	**.71190**	.85362	**.71388**	.85482	**.71585**	.85601	**.71781**	.85720	**.71977**	42
19	.85244	**.71194**	.85364	**.71391**	.85484	**.71588**	.85603	**.71784**	.85722	**.71981**	41
+ **5′**	9.85246	**.71197**	9.85366	**.71394**	9.85486	**.71591**	9.85605	**.71788**	9.85724	**.71984**	40
21	.85248	**.71200**	.85368	**.71397**	.85488	**.71594**	.85607	**.71791**	.85726	**.71987**	39
22	.85250	**.71203**	.85370	**.71401**	.85490	**.71598**	.85609	**.71794**	.85727	**.71990**	38
23	.85252	**.71207**	.85372	**.71404**	.85492	**.71601**	.85611	**.71798**	.85729	**.71994**	37
+ **6′**	9.85254	**.71210**	9.85374	**.71407**	9.85494	**.71604**	9.85613	**.71801**	9.85731	**.71997**	36
25	.85256	**.71213**	.85376	**.71411**	.85496	**.71608**	.85615	**.71804**	.85733	**.72000**	35
26	.85258	**.71217**	.85378	**.71414**	.85498	**.71611**	.85617	**.71807**	.85735	**.72003**	34
27	.85260	**.71220**	.85380	**.71417**	.85500	**.71614**	.85619	**.71811**	.85737	**.72007**	33
+ **7′**	9.85262	**.71223**	9.85382	**.71420**	9.85502	**.71617**	9.85621	**.71814**	9.85739	**.72010**	32
29	.85264	**.71226**	.85384	**.71424**	.85504	**.71621**	.85623	**.71817**	.85741	**.72013**	31
30	.85266	**.71230**	.85386	**.71427**	.85506	**.71624**	.85625	**.71820**	.85743	**.72017**	30
31	.85268	**.71233**	.85388	**.71430**	.85508	**.71627**	.85627	**.71824**	.85745	**.72020**	29
+ **8′**	9.85270	**.71236**	9.85390	**.71434**	9.85510	**.71631**	9.85629	**.71827**	9.85747	**.72023**	28
33	.85272	**.71240**	.85392	**.71437**	.85512	**.71634**	.85631	**.71830**	.85749	**.72026**	27
34	.85274	**.71243**	.85394	**.71440**	.85514	**.71637**	.85633	**.71834**	.85751	**.72030**	26
35	.85276	**.71246**	.85396	**.71443**	.85516	**.71640**	.85635	**.71837**	.85753	**.72033**	25
+ **9′**	9.85278	**.71249**	9.85398	**.71447**	9.85518	**.71644**	9.85637	**.71840**	9.85755	**.72036**	24
37	.85280	**.71253**	.85400	**.71450**	.85520	**.71647**	.85639	**.71843**	.85757	**.72039**	23
38	.85282	**.71256**	.85402	**.71453**	.85522	**.71650**	.85641	**.71847**	.85759	**.72043**	22
39	.85284	**.71259**	.85404	**.71456**	.85524	**.71653**	.85643	**.71850**	.85761	**.72046**	21
+ **10′**	9.85286	**.71263**	9.85406	**.71460**	9.85526	**.71657**	9.85645	**.71853**	9.85763	**.72049**	20
41	.85288	**.71266**	.85408	**.71463**	.85528	**.71660**	.85647	**.71856**	.85765	**.72052**	19
42	.85290	**.71269**	.85410	**.71466**	.85530	**.71663**	.85649	**.71860**	.85767	**.72056**	18
43	.85292	**.71273**	.85412	**.71470**	.85532	**.71667**	.85651	**.71863**	.85769	**.72059**	17
+ **11′**	9.85294	**.71276**	9.85414	**.71473**	9.85534	**.71670**	9.85653	**.71866**	9.85771	**.72062**	16
45	.85296	**.71279**	.85416	**.71476**	.85536	**.71673**	.85654	**.71870**	.85773	**.72066**	15
46	.85298	**.71282**	.85418	**.71480**	.85538	**.71676**	.85656	**.71873**	.85775	**.72069**	14
47	.85300	**.71286**	.85420	**.71483**	.85540	**.71680**	.85658	**.71876**	.85777	**.72072**	13
+ **12′**	9.85302	**.71289**	9.85422	**.71486**	9.85542	**.71683**	9.85660	**.71879**	9.85779	**.72075**	12
49	.85304	**.71292**	.85424	**.71489**	.85544	**.71686**	.85662	**.71883**	.85781	**.72079**	11
50	.85306	**.71296**	.85426	**.71493**	.85546	**.71690**	.85664	**.71886**	.85783	**.72082**	10
51	.85308	**.71299**	.85428	**.71496**	.85548	**.71693**	.85666	**.71889**	.85785	**.72085**	9
+ **13′**	9.85310	**.71302**	9.85430	**.71499**	9.85550	**.71696**	9.85668	**.71892**	9.85787	**.72088**	8
53	.85312	**.71305**	.85432	**.71503**	.85552	**.71699**	.85670	**.71896**	.85788	**.72092**	7
54	.85314	**.71309**	.85434	**.71506**	.85554	**.71703**	.85672	**.71899**	.85790	**.72095**	6
55	.85316	**.71312**	.85436	**.71509**	.85555	**.71706**	.85674	**.71902**	.85792	**.72098**	5
+ **14′**	9.85318	**.71315**	9.85438	**.71512**	9.85557	**.71709**	9.85676	**.71905**	9.85794	**.72101**	4
57	.85320	**.71319**	.85440	**.71516**	.85559	**.71712**	.85678	**.71909**	.85796	**.72105**	3
58	.85322	**.71322**	.85442	**.71519**	.85561	**.71716**	.85680	**.71912**	.85798	**.72108**	2
59	.85324	**.71325**	.85444	**.71522**	.85563	**.71719**	.85682	**.71915**	.85800	**.72111**	1
+ **15′**	9.85326	**.71328**	9.85446	**.71526**	9.85565	**.71722**	9.85684	**.71919**	9.85802	**.72114**	0
	$16^h 19^m$		$16^h 18^m$		$16^h 17^m$		$16^h 16^m$		$16^h 15^m$		

TABLE 45.

Haversines.

s	$7^{h}\ 45^{m}$ 116° 15′		$7^{h}\ 46^{m}$ 116° 30′		$7^{h}\ 47^{m}$ 116° 45′		$7^{h}\ 48^{m}$ 117° 0′		$7^{h}\ 49^{m}$ 117° 15′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.85802	**.72114**	9.85920	**.72310**	9.86037	**.72505**	9.86153	**.72700**	9.86269	**.72894**	60
1	.85804	**.72118**	.85922	**.72313**	.86039	**.72508**	.86155	**.72703**	.86271	**.72897**	59
2	.85806	**.72121**	.85924	**.72316**	.86041	**.72511**	.86157	**.72706**	.86273	**.72900**	58
3	.85808	**.72124**	.85926	**.72320**	.86043	**.72515**	.86159	**.72709**	.86275	**.72903**	57
+ 1′	9.85810	**.72127**	9.85928	**.72323**	9.86045	**.72518**	9.86161	**.72712**	9.86277	**.72907**	56
5	.85812	**.72131**	.85930	**.72326**	.86046	**.72521**	.86163	**.72716**	.86279	**.72910**	55
6	.85814	**.72134**	.85931	**.72329**	.86048	**.72524**	.86165	**.72719**	.86281	**.72913**	54
7	.85816	**.72137**	.85933	**.72333**	.86050	**.72528**	.86167	**.72722**	.86282	**.72916**	53
+ 2′	9.85818	**.72141**	9.85935	**.72336**	9.86052	**.72531**	9.86169	**.72725**	9.86284	**.72920**	52
9	.85820	**.72144**	.85937	**.72339**	.86054	**.72534**	.86171	**.72729**	.86286	**.72923**	51
10	.85822	**.72147**	.85939	**.72342**	.86056	**.72537**	.86173	**.72732**	.86288	**.72926**	50
11	.85824	**.72150**	.85941	**.72346**	.86058	**.72541**	.86174	**.72735**	.86290	**.72929**	49
+ 3′	9.85826	**.72154**	9.85943	**.72349**	9.86060	**.72544**	9.86176	**.72738**	9.86292	**.72932**	48
13	.85828	**.72157**	.85945	**.72352**	.86062	**.72547**	.86178	**.72742**	.86294	**.72936**	47
14	.85830	**.72160**	.85947	**.72355**	.86064	**.72550**	.86180	**.72745**	.86296	**.72939**	46
15	.85832	**.72163**	.85949	**.72359**	.86066	**.72554**	.86182	**.72748**	.86298	**.72942**	45
+ 4′	9.85834	**.72167**	9.85951	**.72362**	9.86068	**.72557**	9.86184	**.72751**	9.86300	**.72945**	44
17	.85836	**.72170**	.85953	**.72365**	.86070	**.72560**	.86186	**.72755**	.86302	**.72949**	43
18	.85838	**.72173**	.85955	**.72368**	.86072	**.72563**	.86188	**.72758**	.86304	**.72953**	42
19	.85840	**.72176**	.85957	**.72372**	.86074	**.72567**	.86190	**.72761**	.86306	**.72955**	41
+ 5′	9.85841	**.72180**	9.85959	**.72375**	9.86076	**.72570**	9.86192	**.72764**	9.86307	**.72958**	40
21	.85843	**.72183**	.85961	**.72378**	.86078	**.72573**	.86194	**.72768**	.86309	**.72962**	39
22	.85845	**.72186**	.85963	**.72381**	.86080	**.72576**	.86196	**.72771**	.86311	**.72965**	38
23	.85847	**.72189**	.85965	**.72385**	.86081	**.72580**	.86198	**.72774**	.86313	**.72968**	37
+ 6′	9.85849	**.72193**	9.85967	**.72388**	9.86083	**.72583**	9.86200	**.72777**	9.86315	**.72971**	36
25	.85851	**.72196**	.85969	**.72391**	.86085	**.72586**	.86201	**.72780**	.86317	**.72974**	35
26	.85853	**.72199**	.85971	**.72394**	.86087	**.72589**	.86203	**.72784**	.86319	**.72978**	34
27	.85855	**.72202**	.85972	**.72398**	.86089	**.72593**	.86205	**.72787**	.86321	**.72981**	33
+ 7′	9.85857	**.72206**	9.85974	**.72401**	9.86091	**.72596**	9.86207	**.72790**	9.86323	**.72984**	32
29	.85859	**.72209**	.85976	**.72404**	.86093	**.72599**	.86209	**.72793**	.86325	**.72987**	31
30	.85861	**.72212**	.85978	**.72407**	.86095	**.72602**	.86211	**.72797**	.86327	**.72991**	30
31	.85863	**.72215**	.85980	**.72411**	.86097	**.72606**	.86213	**.72800**	.86329	**.72994**	29
+ 8′	9.85865	**.72219**	9.85982	**.72414**	9.86099	**.72609**	9.86215	**.72803**	9.86331	**.72997**	28
33	.85867	**.72222**	.85984	**.72417**	.86101	**.72612**	.86217	**.72806**	.86332	**.73000**	27
34	.85869	**.72225**	.85986	**.72420**	.86103	**.72615**	.86219	**.72810**	.86334	**.73004**	26
35	.85871	**.72229**	.85988	**.72424**	.86105	**.72618**	.86221	**.72813**	.86336	**.73007**	25
+ 9′	9.85873	**.72232**	9.85990	**.72427**	9.86107	**.72622**	9.86223	**.72816**	9.86338	**.73010**	24
37	.85875	**.72235**	.85992	**.72430**	.86109	**.72625**	.86225	**.72819**	.86340	**.73013**	23
38	.85877	**.72238**	.85994	**.72433**	.86111	**.72628**	.86227	**.72823**	.86342	**.73016**	22
39	.85879	**.72242**	.85996	**.72437**	.86112	**.72631**	.86229	**.72826**	.86344	**.73020**	21
+ 10′	9.85881	**.72245**	9.85998	**.72440**	9.86114	**.72635**	9.86230	**.72829**	9.86346	**.73023**	20
41	.85883	**.72248**	.86000	**.72443**	.86116	**.72638**	.86232	**.72832**	.86348	**.73026**	19
42	.85885	**.72251**	.86002	**.72446**	.86118	**.72641**	.86234	**.72835**	.86350	**.73029**	18
43	.85887	**.72255**	.86004	**.72450**	.86120	**.72644**	.86236	**.72839**	.86352	**73033**	17
+ 11′	9.85888	**.72258**	9.86006	**.72453**	9.86122	**.72648**	9.86238	**.72842**	9.86354	**.73036**	16
45	.85890	**.72261**	.86008	**.72456**	.86124	**.72651**	.86240	**.72845**	.86355	**.73039**	15
46	.85892	**.72264**	.86010	**.72459**	.86126	**.72654**	.86242	**.72848**	.86357	**.73042**	14
47	.85894	**.72268**	.86011	**.72463**	.86128	**.72657**	.86244	**.72852**	.86359	**.73046**	13
+ 12′	9.85896	**.72271**	9.86013	**.72466**	9.86130	**.72661**	9.86246	**.72855**	9.86361	**.73049**	12
49	.85898	**.72274**	.86015	**.72469**	.86132	**.72664**	.86248	**.72858**	.86363	**.73052**	11
50	.85900	**.72277**	.86017	**.72472**	.86134	**.72667**	.86250	**.72861**	.86365	**.73055**	10
51	.85902	**.72281**	.86019	**72476**	.86136	**.72670**	.86252	**.72865**	.86367	**.73058**	9
+ 13′	9.85904	**.72284**	9.86021	**.72479**	9.86138	**.72674**	9.86254	**.72868**	9.86369	**.73062**	8
53	.85906	**.72287**	.86023	**.72482**	.86140	**.72677**	.86256	**.72871**	.86371	**.73065**	7
54	.85908	**.72290**	.86025	**.72485**	.86142	**.72680**	.86257	**.72874**	.86373	**.73068**	6
55	.85910	**.72294**	.86027	**.72489**	.86143	**.72683**	.86259	**.72878**	.86375	**.73071**	5
+ 14′	9.85912	**.72297**	9.86029	**.72492**	9.86145	**.72687**	9.86261	**.72881**	9.86377	**.73076**	4
57	.85914	**.72300**	.86031	**.72495**	.86147	**.72690**	.86263	**.72884**	.86379	**.73078**	3
58	.85916	**.72303**	.86033	**.72498**	.86149	**.72693**	.86265	**.72887**	.86380	**.73081**	2
59	.85918	**72307**	.86035	**.72502**	.86151	**.72696**	.86267	**.72890**	.86382	**.73084**	1
+ 15′	9.85920	**.72310**	9.86037	**.72505**	9.86153	**.72700**	9.86269	**.72894**	9.86384	**.73087**	0
	$16^{h}\ 14^{m}$		$16^{h}\ 13^{m}$		$16^{h}\ 12^{m}$		$16^{h}\ 11^{m}$		$16^{h}\ 10^{m}$		

TABLE 45.

Haversines.

	$7^h\ 50^m$ 117° 30′		$7^h\ 51^m$ 117° 45′		$7^h\ 52^m$ 118° 0′		$7^h\ 53^m$ 118° 15′		$7^h\ 54^m$ 118° 30′		
s	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav	Nat. Hav	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	9.86384	.73087	9.86499	.73281	9.86613	.73474	9.86727	.73666	9.86840	.73858	60
1	.86386	.73091	.86501	.73284	.86615	.73477	.86729	.73669	.86842	.73861	59
2	.86388	.73094	.86503	.73287	.86617	.73480	.86730	.73672	.86843	.73864	58
3	.86390	.73097	.86505	.73290	.86619	73483	.86732	.73676	.86845	.73868	57
+ 1′	9.86392	.73100	9.86507	.73294	9.86621	.73486	9.86734	.73679	9.86847	.73871	56
5	.86394	.73104	.86509	.73297	.86623	.73490	.86736	.73682	.86849	.73874	55
6	.86396	.73107	.86510	.73300	.86625	.73493	.86738	.73685	.86851	.73877	54
7	.86398	.73110	.86512	.73303	.86626	.73496	.86740	.73688	.86853	.73880	53
+ 2′	9.86400	.73113	9.86514	.73306	9.86628	.73499	9.86742	.73692	9.86855	.73884	52
9	.86401	.73116	.86516	.73310	.86630	.73502	.86744	.73695	.86857	.73887	51
10	.86403	.73120	.86518	.73313	.86632	.73506	.86746	.73698	.86859	.73890	50
11	.86405	.73123	.86520	.73316	.86654	.73509	.86747	.73701	.86860	.73893	49
+ 3′	9.86407	.73126	9.86522	.73319	9.86636	.73512	9.86749	.73704	9.86862	.73896	48
13	.86409	.73129	.86524	.73323	.86638	.73515	.86751	.73708	.86864	.73899	47
14	.86411	.73133	.86526	.73326	.86640	.73519	.86753	.73711	.86866	.73903	46
15	.86413	.73136	.86528	.73329	.86642	.73522	.86755	.73714	.86868	.73906	45
+ 4′	9.86415	.73139	9.86529	.73332	9.86643	.73525	9.86757	.73717	9.86870	.73909	44
17	.86417	.73142	.86531	.73335	.86645	.73528	.86759	.73720	.86872	.73912	43
18	.86419	.73145	.86533	.73339	.86647	.73531	.86761	.73724	.86874	.73915	42
19	.86421	.73149	.86535	.73342	.86649	.73535	.86763	.73727	.86875	.73919	41
+ 5′	9.86423	.73152	9.86537	.73345	9.86651	.73538	9.86764	.73730	9.86877	.73922	40
21	.86424	.73155	.86539	.73348	.86653	.73541	.86766	.73733	.86879	.73925	39
22	.86426	.73158	.86541	.73351	.86655	.73544	.86768	.73736	.86881	.73928	38
23	.86428	.73162	.86543	.73355	.86657	.73547	.86770	.73740	.86883	.73931	37
+ 6′	9.86430	.73165	9.86545	.73358	9.86659	.73551	9.86772	.73743	9.86885	.73935	36
25	.86432	.73168	.86547	.73361	.86661	.73554	.86774	.73746	.86887	.73938	35
26	.86434	.73171	.86569	.73364	.86662	.73557	.86776	.73749	.86889	.73941	34
27	.86436	.73174	.86550	.73368	.86664	.73560	.86778	.73752	.86890	.73944	33
+ 7′	9.86438	.73178	9.86552	.73371	9.86666	.73563	9.86780	.73756	9.86892	.73947	32
29	.86440	.73181	.86554	.73374	.86668	.73567	.86781	.73759	.86894	.73951	31
30	.86442	.73184	.86556	.73377	.86670	.73570	.86783	73762	.86896	.73954	30
31	.86444	.73187	.86558	.73380	.86672	.73573	.86785	.73765	.86898	.73957	29
+ 8′	9.86446	.73191	9.86560	.73384	9.86674	.73576	9.86787	.73768	9.86900	.73960	28
33	.86447	.73194	.86562	.73387	.86676	.73579	.86789	.73772	.86902	.73963	27
34	.86449	.73197	.86564	.73390	.86678	.73583	.86791	.73775	.86904	.73967	26
35	.86451	.73200	.86566	.73393	.86679	.73586	.86793	.73778	.86905	.73970	25
+ 9′	9.86453	.73203	9.86568	.73396	9.86681	.73589	9.86795	.73781	9.86907	.73973	24
37	.86455	.73207	.86569	.73400	.86683	.73592	.86796	.73784	.86909	.73976	23
38	.86457	.73210	.86571	.73403	.86685	.73595	.86798	.73788	.86911	.73979	22
39	.86459	.73213	.86573	.73406	.86687	.73599	.86800	.73791	.86913	.73982	21
+ 10′	9.86461	.73216	9.86575	.73409	9.86689	.73602	9.86802	.73794	9.86915	.73986	20
41	.86463	.73220	.86577	.73413	.86691	.73605	.86804	.73797	.86917	.73989	19
42	.86465	.73223	.86579	.73416	.86693	.73608	.86806	.73800	.86919	.73992	18
43	.86467	.73226	.86581	.73419	.86695	.73611	.86808	.73804	.86920	.73995	17
+ 11′	9.86468	.73229	9.86583	.73422	9.86696	.73615	9.86810	.73807	9.86922	.73998	16
45	.86470	.73232	.86585	.73425	.86698	.73618	.86812	.73810	.86924	.74002	15
46	.86472	.73236	.86587	.73429	.86700	.73621	.86813	.73813	.86926	.74005	14
47	.86474	.73239	.86588	.73432	.86702	.73624	.86815	.73816	.86928	.74008	13
+ 12′	9.86476	.73242	9.86590	.73435	9.86704	.73628	9.86817	.73820	9.86930	.74011	12
49	.86478	.73245	.86592	.73438	.86706	.73631	.86819	.73823	.86932	.74014	11
50	.86480	.73249	.86594	.73441	.86708	.73634	.86821	.73826	.86933	.74018	10
51	.86482	.73252	.86596	.73445	.86710	.73637	.86823	.73829	.86935	.74021	9
+ 13′	9.86484	.73255	9.86598	.73448	9.86712	.73640	9.86825	.73832	9.86937	.74024	8
53	.86486	.73258	.86600	.73451	.86713	.73644	.86827	.73836	.86939	.74027	7
54	.86488	.73261	.86602	.73454	.86715	.73647	.86828	.73839	.86941	.74030	6
55	.86489	.73265	.86604	.73458	.86717	.73650	.86830	.73842	.86943	.74033	5
+ 14′	9.86491	.73268	9.86606	.73461	9.86719	.73653	9.86832	.73845	9.86945	.74037	4
57	.86493	.73271	.86607	.73464	.86721	.73656	.86834	.73848	.86947	.74040	3
58	.86495	.73274	.86609	.73467	.86723	.73660	.86836	.73852	.86948	.74043	2
59	.86497	.73278	.86611	.73470	.86725	.73663	.86838	.73855	.86950	.74046	1
+ 15′	9.86499	.73281	9.86613	.73474	9.86727	.73666	9.86840	.73858	9.86952	.74049	0
	$16^h\ 9^m$		$16^h\ 8^m$		$16^h\ 7^m$		$16^h\ 6^m$		$16^h\ 5^m$		

TABLE 45.

Haversines.

s	$7^h\ 55^m$ 118° 45′		$7^h\ 56^m$ 119° 0′		$7^h\ 57^m$ 119° 15′		$7^h\ 58^m$ 119° 30′		$7^h\ 59^m$ 119° 45′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	9.86952	.74049	9.87064	.74240	9.87175	.74431	9.87286	.74621	9.87396	.74811	60
1	.86954	.74052	.87066	.74244	.87177	.74434	.87288	.74624	.87398	.74814	59
2	.86956	.74056	.87068	.74247	.87179	.74437	.87290	.74628	.87400	.74817	58
3	.86958	.74059	.87070	.74250	.87181	.74441	.87292	.74631	.87402	.74820	57
+ 1′	9.86960	.74062	9.87072	.74253	9.87183	.74444	9.87294	.74634	9.87404	.74823	56
5	.86962	.74065	.87073	.74256	.87185	.74447	.87295	.74637	.87406	.74827	55
6	.86963	.74069	.87075	.74260	.87187	.74450	.87297	.74640	.87407	.74830	54
7	.86965	.74072	.87077	.74263	.87188	.74453	.87299	.74643	.87409	.74833	53
+ 2′	9.86967	.74075	9.87079	.74266	9.87190	.74456	9.87301	.74646	9.87411	.74836	52
9	.86989	.74078	.87081	.74269	.87192	.74460	.87303	.74650	.87413	.74839	51
10	.86971	.74081	.87083	.74272	.87194	.74463	.87305	.74653	.87415	.74842	50
11	.86973	.74084	.87085	.74275	.87196	.74466	.87306	.74656	.87417	.74846	49
+ 3′	9.86975	.74088	9.87086	.74279	9.87198	.74469	9.87308	.74659	9.87418	.74849	48
13	.86977	.74091	.87088	.74282	.87199	.74472	.87310	.74662	.87420	.74852	47
14	.86978	.74094	.87090	.74285	.87201	.74475	.87312	.74665	.87422	.74855	46
15	.86980	.74097	.87092	.74288	.87203	.74479	.87314	.74669	.87424	.74858	45
+ 4′	9.86982	.74100	9.87094	.74291	9.87205	.74482	9.87316	.74672	9.87426	.74861	44
17	.86984	.74104	.87096	.74294	.87207	.74485	.87318	.74675	.87428	.74864	43
18	.86986	.74107	.87098	.74298	.87209	.74488	.87319	.74678	.87429	.74868	42
19	.86988	.74110	.87100	.74301	.87211	.74491	.87321	.74681	.87431	74871	41
+ 5′	9.86990	.74113	9.87101	.74304	9.87212	.74494	9.87323	.74684	9.87433	.74874	40
21	.86991	.74116	.87103	.74307	.87214	.74498	.87325	.74688	.87435	.74877	39
22	.86993	.74120	.87105	.74310	.87216	.74501	.87327	.74691	.87437	.74880	38
23	.86995	.74123	.87107	.74314	.87218	.74504	.87329	.74694	.87439	.74883	37
+ 6′	9.86997	.74126	9.87109	.74317	9.87220	.74507	9.87330	.74697	9.87440	.74887	36
25	.86999	.74129	.87111	.74320	.87222	.74510	.87332	.74700	.87442	.74890	35
26	.87001	.74132	.87112	.74323	.87224	.74514	.87334	.74703	.87444	.74893	34
27	.87003	.74135	.87114	.74326	.87225	.74517	.87336	.74707	.87446	.74896	33
+ 7′	9.87004	.74139	9.87116	.74329	9.87227	.74520	9.87338	.74710	9.87448	.74899	32
29	.87006	.74142	.87118	.74333	.87229	.74523	.87340	.74713	.87450	.74902	31
30	.87008	.74145	.87120	.74336	.87231	.74526	.87341	.74716	.87451	.74905	30
31	.87010	.74148	.87122	.74339	.87233	.74529	.87343	.74719	.87453	.74908	29
+ 8′	9.87012	.74151	9.87124	.74342	9.87235	.74533	9.87345	.74722	9.87455	.74912	28
33	.87014	.74155	.87125	.74345	.87236	.74536	.87347	.74726	.87457	.74915	27
34	.87016	.74158	.87127	.74349	.87238	.74539	.87349	.74729	.87459	.74918	26
35	.87018	.74161	.87129	.74352	.87240	.74542	.87351	.74732	.87460	.74921	25
+ 9′	9.87019	.74164	9.87131	.74355	9.87242	.74545	9.87352	.74735	9.87462	.74924	24
37	.87021	.74167	.87133	.74358	.87244	.74548	.87354	.74738	.87464	.74928	23
38	.87023	.74170	.87135	.74361	.87246	.74552	.87356	.74741	.87466	.74931	22
39	.87025	.74174	.87137	.74364	.87248	.74555	.87358	.74744	.87468	.74934	21
+ 10′	9.87027	.74177	9.87138	.74368	9.87249	.74558	9.87360	.74748	9.87470	.74937	20
41	.87029	.74180	.87140	.74371	.87251	.74561	.87362	.74751	.87471	.74940	19
42	.87031	.74183	.87142	.74374	.87253	.74564	.87363	.74754	.87473	.74943	18
43	.87032	.74186	.87144	.74377	.87255	.74567	.87365	.74757	.87475	.74946	17
+ 11′	9.87034	.74190	9.87146	.74380	9.87257	.74571	9.87367	.74760	9.87477	.74950	16
45	.87036	.74193	.87148	.74383	.87259	.74574	.87369	.74763	.87479	.74953	15
46	.87038	.74196	.87149	.74387	.87260	.74577	.87371	.74767	.87481	.74956	14
47	.87040	.74199	.87151	.74390	.87262	.74580	.87373	.74770	.87482	.74959	13
+ 12′	9.87042	.74202	9.87153	.74393	9.87264	.74583	9.87374	.74773	9.87484	.74962	12
49	.87044	.74205	.87155	.74396	.87266	.74586	.87376	.74776	.87486	.74965	11
50	.87045	.74209	.87157	.74399	.87268	.74590	.87378	.74779	.87488	.74969	10
51	.87047	.74212	.87159	.74402	.87270	.74593	.87380	.74782	.87490	.74972	9
+ 13′	9.87049	.74215	9.87161	.74406	9.87271	.74596	9.87382	.74786	9.87492	.74975	8
53	.87051	.74218	.87162	.74409	.87273	.74599	.87384	.74789	.87493	.74978	7
54	.87053	.74221	.87164	.74412	.87275	.74602	.87385	.74792	.87495	.74981	6
55	.87055	.74225	.87166	.74415	.87277	.74605	.87387	.74795	.87497	.74984	5
+ 14′	9.87057	.74228	9.87168	.74418	9.87279	.74609	9.87389	.74798	9.87499	.74987	4
57	.87059	.74231	.87170	.74422	.87281	.74612	.87391	.74801	.87501	.74991	3
58	.87060	.74234	.87172	.74425	.87283	.74615	.87393	.74805	.87502	.74994	2
59	.87062	.74237	.87174	.74428	.87284	.74618	.87395	.74808	.87504	.74997	1
+ 15′	9.87064	.74240	9.87175	.74431	9.87286	.74621	9.87396	.74811	9.87506	.75000	0
	$16^h\ 4^m$		$16^h\ 3^m$		$16^h\ 2^m$		$16^h\ 1^m$		$16^h\ 0^m$		

TABLE 45.

Haversines.

s ′	$8^h 0^m$ 120° 0′		$8^h 2^m$ 120° 30′		$8^h 4^m$ 121° 0′		$8^h 6^m$ 121° 30′		$8^h 8^m$ 122° 0′		
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0 0	9.87506	**0.75000**	9.87724	**0.75377**	9.87939	**0.75752**	9.88153	**0.76125**	9.88364	**0.76496**	60
2	.87510	**.75006**	.87727	**.75383**	.87943	**.75758**	.88156	**.76131**	.88367	**.76502**	58
4+ 1	.87513	**.75013**	.87731	**.75389**	.87947	**.75764**	.88160	**.76137**	.88371	**.76508**	56
6	.87517	**.75019**	.87735	**.75396**	.87950	**.75771**	.88163	**.76144**	.88374	**.76514**	54
8+ 2	9.87521	**0.75025**	9.87738	**0.75402**	9.87954	**0.75777**	9.88167	**0.76150**	9.88378	**0.76521**	52
10	.87524	**.75032**	.87742	**.75408**	.87957	**.75783**	.88170	**.76156**	.88381	**.76527**	50
12+ 3	.87528	**.75038**	.87745	**.75415**	.87961	**.75789**	.88174	**.76162**	.88385	**.76533**	48
14	.87532	**.75044**	.87749	**.75421**	.87964	**.75795**	.88177	**.76168**	.88388	**.76539**	46
16+ 4	9.87535	**0.75050**	9.87753	**0.75427**	9.87968	**0.75802**	9.88181	**0.76175**	9.88392	**0.76545**	44
18	.87539	**.75057**	.87756	**.75433**	.87971	**.75808**	.88185	**.76181**	.88395	**.76551**	42
20+ 5	.87543	**.75063**	.87760	**.75440**	.87975	**.75814**	.88188	**.76187**	.88399	**.76558**	40
22	.87546	**.75069**	.87764	**.75446**	.87979	**.75820**	.88192	**.76193**	.88402	**.76564**	38
24+ 6	9.87550	**0.75075**	9.87767	**0.75452**	9.87982	**0.75827**	9.88195	**0.76199**	9.88406	**0.76570**	36
26	.87553	**.75082**	.87771	**.75458**	.87986	**.75833**	.88199	**.76205**	.88409	**.76576**	34
28+ 7	.87557	**.75088**	.87774	**.75465**	.87989	**.75839**	.88202	**.76212**	.88413	**.76582**	32
30	.87561	**.75094**	.87778	**.75471**	.87993	**.75845**	.88206	**.76218**	.88416	**.76588**	30
32+ 8	9.87564	**0.75101**	9.87782	**0.75477**	9.87996	**0.75852**	9.88209	**0.76224**	9.88420	**0.76595**	28
34	.87568	**.75107**	.87785	**.75483**	.88000	**.75858**	.88213	**.76230**	.88423	**.76601**	26
36+ 9	.87572	**.75113**	.87789	**.75490**	.88004	**.75864**	.88216	**.76236**	.88427	**.76607**	24
38	.87575	**.75120**	.87792	**.75496**	.88007	**.75870**	.88220	**.76243**	.88430	**.76613**	22
40+10	9.87579	**0.75126**	9.87796	**0.75502**	9.88011	**0.75876**	9.88223	**0.76249**	9.88434	**0.76619**	20
42	.87583	**.75132**	.87800	**.75508**	.88014	**.75883**	.88227	**.76255**	.88437	**.76625**	18
44+11	.87586	**.75138**	.87803	**.75515**	.88018	**.75889**	.88230	**.76261**	.88441	**.76632**	16
46	.87590	**.75145**	.87807	**.75521**	.88021	**.75895**	.88234	**.76267**	.88444	**.76638**	14
48+12	9.87593	**0.75151**	9.87810	**0.75527**	9.88025	**0.75901**	9.88237	**0.76274**	9.88448	**0.76644**	12
50	.87597	**.75157**	.87814	**.75533**	.88029	**.75908**	.88241	**.76280**	.88451	**.76650**	10
52+13	.87601	**.75164**	.87818	**.75540**	.88032	**.75914**	.88244	**.76286**	.88455	**.76656**	8
54	.87604	**.75170**	.87821	**.75546**	.88036	**.75920**	.88248	**.76292**	.88458	**.76662**	6
56+14	9.87608	**0.75176**	9.87825	**0.75552**	9.88039	**0.75926**	9.88252	**0.76298**	9.88462	**0.76668**	4
58	9.87612	**0.75182**	9.87828	**0.75558**	9.88043	**0.75932**	9.88255	**0.76305**	9.88465	**0.76675**	2
	$15^h 59^m$		$15^h 57^m$		$15^h 55^m$		$15^h 53^m$		$15^h 51^m$		

s ′	$8^h 1^m$ 120° 0′		$8^h 3^m$ 120° 30′		$8^h 5^m$ 121° 0′		$8^h 7^m$ 121° 30′		$8^h 9^m$ 122° 0′		s
0+15	9.87615	**0.75189**	9.87832	**0.75565**	9.88046	**0.75939**	9.88259	**0.76311**	9.88469	**0.76681**	60
2	.87619	**.75195**	.87835	**.75571**	.88050	**.75945**	.88262	**.76317**	.88472	**.76687**	58
4+16	.87623	**.75201**	.87839	**.75577**	.88053	**.75951**	.88266	**.76323**	.88476	**.76693**	56
6	.87626	**.75208**	.87843	**.75583**	.88057	**.75957**	.88269	**.76329**	.88479	**.76699**	54
8+17	9.87630	**0.75214**	9.87846	**0.75590**	9.88061	**0.75964**	9.88273	**0.76335**	9.88483	**0.76705**	52
10	.87633	**.75220**	.87850	**.75596**	.88064	**.75970**	.88276	**.76342**	.88486	**.76711**	50
12+18	.87637	**.75226**	.87853	**.75602**	.88068	**.75976**	.88280	**.76348**	.88490	**.76718**	48
14	.87641	**.75233**	.87857	**.75608**	.88071	**.75982**	.88283	**.76354**	.88493	**.76724**	46
16+19	9.87644	**0.75239**	9.87861	**0.75615**	9.88075	**0.75988**	9.88287	**0.76360**	9.88496	**0.76730**	44
18	.87648	**.75245**	.87864	**.75621**	.88078	**.75995**	.88290	**.76366**	.88500	**.76736**	42
20+20	.87652	**.75251**	.87868	**.75627**	.88082	**.76001**	.88294	**.76373**	.88503	**.76742**	40
22	.87655	**.75258**	.87871	**.75633**	.88085	**.76007**	.88297	**.76379**	.88507	**.76748**	38
24+21	9.87659	**0.75264**	9.87875	**0.75640**	9.88089	**0.76013**	9.88301	**0.76385**	9.88510	**0.76754**	36
26	.87662	**.75270**	.87879	**.75646**	.88092	**.76019**	.88304	**.76391**	.88514	**.76761**	34
28+22	.87666	**.75277**	.87882	**.75652**	.88096	**.76026**	.88308	**.76397**	.88517	**.76767**	32
30	.87670	**.75283**	.87886	**.75658**	.88100	**.76032**	.88311	**.76403**	.88521	**.76773**	30
32+23	9.87673	**0.75289**	9.87889	**0.75665**	9.88103	**0.76038**	9.88315	**0.76410**	9.88524	**0.76779**	28
34	.87677	**.75295**	.87893	**.75671**	.88107	**.76044**	.88318	**.76416**	.88528	**.76785**	26
36+24	.87680	**.75302**	.87896	**.75677**	.88110	**.76050**	.88322	**.76422**	.88531	**.76791**	24
38	.87684	**.75308**	.87900	**.75683**	.88114	**.76057**	.88325	**.76428**	.88535	**.76797**	22
40+25	9.87688	**0.75314**	9.87904	**0.75690**	9.88117	**0.76063**	9.88329	**0.76434**	9.88528	**0.76804**	20
42	.87691	**.75321**	.87907	**.75696**	.88121	**.76069**	.88332	**.76440**	.88542	**.76810**	18
44+26	.87695	**.75327**	.87911	**.75702**	.88124	**.76075**	.88336	**.76447**	.88545	**.76816**	16
46	.87699	**.75333**	.87914	**.75708**	.88128	**.76082**	.88339	**.76453**	.88549	**.76822**	14
48+27	9.87702	**0.75339**	9.87918	**0.75714**	9.88131	**0.76088**	9.88343	**0.76459**	9.88552	**0.76828**	12
50	.87706	**.75346**	.87921	**.75721**	.88135	**.76094**	.88346	**.76465**	.88556	**.76834**	10
52+28	.87709	**.75352**	.87925	**.75727**	.88139	**.76100**	.88350	**.76471**	.88559	**.76840**	8
54	.87713	**.75358**	.87929	**.75733**	.88142	**.76106**	.88353	**.76477**	.88562	**.76847**	6
56+29	9.87717	**0.75364**	9.87932	**0.75739**	9.88146	**0.76113**	9.88357	**0.76484**	9.88566	**0.76853**	4
58	.87720	**.75371**	.87936	**.75746**	.88149	**.76119**	.88360	**.76490**	.88569	**.76859**	2
60+30	9.87724	**0.75377**	9.87939	**0.75752**	9.88153	**0.76125**	9.88364	**0.76496**	9.88573	**0.76865**	0
	$15^h 58^m$		$15^h 56^m$		$15^h 54^m$		$15^h 52^m$		$15^h 50^m$		

TABLE 45.

Haversines.

	8h 10m 122° 30′		8h 12m 123° 0′		8h 14m 123° 30′		8h 16m 124° 0′		8h 18m 124° 30′		
s ′	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0 **0**	9.88573	**0.76865**	9.88780	**0.77232**	9.88984	**0.77597**	9.89187	**0.77960**	9.89387	**0.78320**	60
2	.88576	**.76871**	.88783	**.77238**	.88988	**.77603**	.89190	**.77966**	.89391	**.78326**	58
4+ **1**	.88580	**.76877**	.88787	**.77244**	.88991	**.77609**	.89194	**.77972**	.89394	**.78332**	56
6	.88583	**.76883**	.88790	**.77250**	.88995	**.77615**	.89197	**.77978**	.89397	**.78338**	54
8+ **2**	9.88587	**0.76890**	9.88793	**0.77256**	9.88998	**0.77621**	9.89200	**0.77984**	9.89400	**0.78344**	52
10	.88590	**.76896**	.88797	**.77262**	.89001	**.77627**	.89204	**.77990**	.89404	**.78350**	50
12+ **3**	.88594	**.76902**	.88800	**.77269**	.89005	**.77633**	.89207	**.77996**	.89407	**.78356**	48
14	.88597	**.76908**	.88804	**.77275**	.89008	**.77639**	.89210	**.78002**	.89411	**.78362**	46
16+ **4**	9.88600	**0.76914**	9.88807	**0.77281**	9.89012	**0.77645**	9.89214	**0.78008**	9.89414	**0.78368**	44
18	.88604	**.76920**	.88811	**.77287**	.89015	**.77651**	.89217	**.78014**	.89417	**.78374**	42
20+ **5**	.88607	**.76926**	.88814	**.77293**	.89018	**.77657**	.89221	**.78020**	.89421	**.78380**	40
22	.88611	**.76932**	.88817	**.77299**	.89022	**.77664**	.89224	**.78026**	.89424	**.78386**	38
24+ **6**	9.88614	**.076939**	9.88821	**0.77305**	9.89025	**0.77670**	9.89227	**0.78032**	9.89427	**0.78392**	36
26	.88618	**.76945**	.88824	**.77311**	.89028	**.77676**	.89231	**.78038**	.89431	**.78398**	34
28+ **7**	.88621	**.76951**	.88828	**.77317**	.89032	**.77682**	.89234	**.78044**	.89434	**.78404**	32
30	.88625	**.76957**	.88831	**.77323**	.89035	**.77688**	.89237	**.78050**	.89437	**.78410**	30
32+ **8**	9.88628	**0.76963**	9.88835	**0.77329**	9.89039	**0.77694**	9.89241	**0.78056**	9.89441	**0.78416**	28
34	.88632	**.76969**	.88838	**.77336**	.89042	**.77700**	.89244	**.78062**	.89444	**.78422**	26
36+ **9**	.88635	**.76975**	.88841	**.77342**	.89045	**.77706**	.89247	**.78068**	.89447	**.78428**	24
38	.88639	**.76981**	.88845	**.77348**	.89049	**.77712**	.89251	**.78074**	.89450	**.78434**	22
40+**10**	9.88642	**0.76988**	9.88848	**0.77354**	9.89052	**0.77718**	9.89254	**0.78080**	9.89454	**0.78440**	20
42	.88645	**.76994**	.88852	**.77360**	.89056	**.77724**	.89257	**.78086**	.89457	**.78446**	18
44+**11**	.88649	**.77000**	.88855	**.77366**	.89059	**.77730**	.89261	**.78092**	.89460	**.78452**	16
46	.88652	**.77000**	.88858	**.77372**	.89062	**.77736**	.89264	**.78098**	.89464	**.78458**	14
48+**12**	9.88656	**0.77012**	9.88862	**0.77378**	9.89066	**0.77742**	9.89267	**0.78104**	9.89467	**0.78464**	12
50	.88659	**.77018**	.88865	**.77384**	.89069	**.77748**	.89271	**.78110**	.89470	**.78470**	10
52+**13**	.88663	**.77024**	.88869	**.77390**	.89072	**.77754**	.89274	**.78116**	.89474	**.78476**	8
54	.88666	**.77030**	.88872	**.77396**	.89076	**.77760**	.89277	**.78122**	.89477	**.78482**	6
56+**14**	9.88670	**0.77036**	9.88876	**0.77403**	9.89079	**0.77766**	9.89281	**0.78128**	9.89480	**0.78488**	4
58	9.88673	**0.77043**	9.88879	**0.77409**	9.89083	**0.77772**	9.89284	**0.78134**	9.89484	**0.78494**	2
	15h 49m		15h 47m		15h 45m		15h 43m		15h 41m		

	8h 11m 122° 30′		8h 13m 123° 0′		8h 15m 123° 30′		8h 17m 124° 0′		8h 19m 124° 30′		
s ′											s
0+**15**	9.88677	**0.77049**	9.88882	**0.77415**	9.89086	**0.77779**	9.89287	**0.78140**	9.89487	**0.78500**	60
2	.88680	**.77055**	.88886	**.77412**	.89089	**.77785**	.89291	**.78146**	.89490	**.78506**	58
4+**16**	.88683	**.77061**	.88889	**.77427**	.89093	**.77791**	.89294	**.78152**	.89493	**.78512**	56
6	.88687	**.77067**	.88893	**.77433**	.89096	**.77797**	.89298	**.78158**	.89497	**.78518**	54
8+**17**	9.88690	**0.77073**	9.88896	**0.77439**	9.89099	**0.77803**	9.89301	**0.78164**	9.89500	**0.78524**	52
10	.88694	**.77079**	.88899	**.77445**	.89102	**.77809**	.89304	**.78170**	.89503	**.78530**	50
12+**18**	.88697	**.77085**	.88903	**.77451**	.89106	**.77815**	.89308	**.78176**	.89507	**.78536**	48
14	.88701	**.77092**	.88906	**.77457**	.89110	**.77821**	.89311	**.78182**	.89510	**.78542**	46
16+**19**	9.88704	**0.77098**	9.88910	**0.77463**	9.89113	**0.77827**	9.89314	**0.78188**	9.89513	**0.78548**	44
18	.88708	**.77104**	.88913	**.77469**	.89116	**.77833**	.89318	**.78194**	.89517	**.78554**	42
20+**20**	.88711	**.77110**	.88916	**.77475**	.89120	**.77839**	.89321	**.78200**	.89520	**.78560**	40
22	.88714	**.77116**	.88920	**.77482**	.89123	**.77845**	.89324	**.78206**	.89523	**.78566**	38
24+**21**	9.88718	**0.77122**	9.88923	**0.77488**	9.89126	**0.77851**	9.89328	**0.78212**	9.89527	**0.78572**	36
26	.88721	**.77128**	.88927	**.77494**	.89130	**.77857**	.89331	**.78218**	.89530	**.78577**	34
28+**22**	.88725	**.77134**	.88930	**.77500**	.89133	**.77863**	.89334	**.78224**	.89533	**.78583**	32
30	.88728	**.77140**	.88933	**.77506**	.89137	**.77869**	.89338	**.78230**	.89536	**.78589**	30
32+**23**	9.88732	**0.77147**	9.88937	**0.77512**	9.89140	**0.77875**	9.89341	**0.78236**	9.89540	**0.78595**	28
34	.88735	**.77153**	.88940	**.77518**	.89143	**.77881**	.89344	**.78242**	.89543	**.78601**	26
36+**24**	.88739	**.77159**	.88944	**.77524**	.89147	**.77887**	.89348	**.78248**	.89546	**.78607**	24
38	.88742	**.77165**	.88947	**.77530**	.89150	**.77893**	.89351	**.78254**	.89550	**.78613**	22
40+**25**	9.88745	**0.77171**	9.88950	**0.77536**	9.89153	**0.77899**	9.89354	**0.78260**	9.89553	**0.78619**	20
42	.88749	**.77177**	.88954	**.77542**	.89157	**.77905**	.89358	**.78266**	.89556	**.78625**	18
44+**26**	.88752	**.77183**	.88957	**.77548**	.89160	**.77911**	.89361	**.78272**	.89559	**.78531**	16
46	.88756	**.77189**	.88961	**.77554**	.89163	**.77917**	.89364	**.78278**	.89563	**.78637**	14
48+**27**	9.88759	**0.77195**	9.88964	**0.77560**	9.89167	**0.77923**	9.89368	**0.78284**	9.89566	**0.78643**	12
50	.88763	**.77201**	.88967	**.77567**	.89170	**.77929**	.89371	**.78290**	.89569	**.78649**	10
52+**28**	.88766	**.77208**	.88971	**.77573**	.89174	**.77936**	.89374	**.78296**	.89573	**.78655**	8
54	.88769	**.77214**	.88974	**.77579**	.89177	**.77942**	.89378	**.78302**	.89576	**.78661**	6
56+**29**	9.88773	**0.77220**	9.88978	**0.77585**	9.89180	**0.77948**	9.89381	**0.78308**	9.89579	**0.78667**	4
58	.88776	**.77226**	.88981	**.77591**	.89184	**.77954**	.89384	**.78314**	.89583	**.78673**	2
60+**30**	9.88780	**0.77232**	9.88984	**0.77597**	9.89187	**0.77960**	9.89387	**0.78320**	9.89586	**0.78679**	0
	15h 48m		15h 46m		15h 44m		15h 42m		15h 40m		

TABLE 45.

Haversines.

	$8^h\,20^m$ 125° 0′		$8^h\,22^m$ 125° 30′		$8^h\,24^m$ 126° 0′		$8^h\,26^m$ 126° 30′		$8^h\,28^m$ 127° 0′		
s ′	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0 0	9.89586	**0.78679**	9.89782	**0.79035**	9.89976	**0.79389**	9.90168	**0.79741**	9.90358	**0.80091**	60
2	.89589	**.78685**	.89785	**.79041**	.89979	**.79395**	.90171	**.79747**	.90361	**.80097**	58
4+ 1	.89592	**.78691**	.89789	**.79047**	.89983	**.79401**	.90175	**.79753**	.90365	**.80102**	56
6	.89596	**.78697**	.89792	**.79053**	.89986	**.79407**	.90178	**.79759**	.90368	**.80108**	54
8+ 2	9.89599	**0.78703**	9.89795	**0.79059**	9.89989	**0.79413**	9.90181	**0.79765**	9.90371	**0.80114**	52
10	.89602	**.78709**	.89798	**.79065**	.89992	**.79419**	.90184	**.79770**	.90374	**.80120**	50
12+ 3	.89606	**.78715**	.89802	**.79071**	.89995	**.79425**	.90187	**.79776**	.90377	**.80126**	48
14	.89609	**.78721**	.89805	**.79077**	.89999	**.79430**	.90191	**.79782**	.90380	**.80131**	46
16+ 4	9.89612	**0.78726**	9.89808	**0.79082**	9.90002	**0.79436**	9.90194	**0.79788**	9.90383	**0.80137**	44
18	.89615	**.78732**	.89811	**.79088**	.90005	**.79442**	.90197	**.79794**	.90387	**.80143**	42
20+ 5	.89619	**.78738**	.89815	**.79094**	.90008	**.79448**	.90200	**.78800**	.90390	**.80149**	40
22	.89622	**.78744**	.89818	**.79100**	.90012	**.79454**	.90203	**.79805**	.90393	**.80155**	38
24+ 6	9.89625	**0.78750**	9.89821	**0.79106**	9.90015	**0.79460**	9.90206	**0.79811**	9.90396	**0.80160**	36
26	.89628	**.78756**	.89824	**.79112**	.90018	**.79466**	.90210	**.79817**	.90399	**.80166**	34
28+ 7	.89632	**.78762**	.89828	**.79118**	.90021	**.79471**	.90213	**.79823**	.90402	**.80172**	32
30	.89635	**.78768**	.89831	**.79124**	.90024	**.79477**	.90216	**.79829**	.90405	**.80178**	30
32+ 8	9.89638	**0.78774**	9.89834	**0.79130**	9.90028	**0.79483**	9.90219	**0.79835**	9.90409	**0.80184**	28
34	.89642	**.78780**	.89837	**.79136**	.90031	**.79489**	.90222	**.79840**	.90412	**.80189**	26
36+ 9	.89645	**.78786**	.89840	**.79142**	.90034	**.79495**	.90225	**.70846**	.90415	**.80195**	24
38	.89648	**.78792**	.89844	**.79148**	.90037	**.79501**	.90229	**.79852**	.90418	**.80201**	22
40+10	9.89651	**0.78798**	9.89847	**0.79153**	9.90040	**0.79507**	9.90232	**0.79858**	9.90421	**0.80207**	20
42	.89655	**.78804**	.89850	**.79159**	.90044	**.79513**	.90235	**.79864**	.90425	**.80213**	18
44+11	.89658	**.78810**	.89853	**.79165**	.90047	**.79519**	.90238	**.79870**	.90428	**.80218**	16
46	.89661	**.78816**	.89857	**.79171**	.90050	**.79524**	.90241	**.79875**	.90431	**.80224**	14
48+12	9.89665	**0.78822**	9.89860	**0.79177**	9.90053	**0.79530**	9.90244	**0.79881**	9.90434	**0.80230**	12
50	.89668	**.78828**	.89863	**.79183**	.90056	**.79536**	.90248	**.79887**	.90437	**.80236**	10
52+13	.89671	**.78834**	.89866	**.79189**	.90060	**.79542**	.90251	**.79899**	.90440	**.80242**	8
54	.89674	**.78839**	.89870	**.79195**	.90063	**.79548**	.90254	**.79893**	.90443	**.80247**	6
56+14	9.89678	**0.78845**	9.89873	**0.79201**	9.90066	**0.79554**	9.90257	**0.79905**	9.90446	**0.80253**	4
58	9.89681	**0.78851**	9.89876	**0.79207**	9.90069	**0.79560**	9.90260	**0.79910**	.9.90449	**0.80259**	2
	$15^h\,39^m$		$15^h 37^m$		$15^h.\,35^m$		$15^h\,33^m$		$15^h\,31^m$		

s ′	$8^h\,21^m$ 125° 0′		$8^h\,23^m$ 125° 30′		$8^h\,25^m$ 126° 0′		$8^h\,27^m$ 126° 30′		$8^h\,29^m$ 127° 0′		s
0+15	9.89684	**0.78857**	9.89879	**0.79212**	.9.90072	**0.79565**	9.90264	**0.79916**	9.90452	**0.80265**	60
2	.89687	**.78863**	.89883	**.79218**	.90076	**.79571**	.90267	**.79922**	.90456	**.80270**	58
4+16	.89691	**.78869**	.89886	**.79224**	.90079	**.79577**	.90270	**.79928**	.90459	**.80276**	56
6	.89694	**.78875**	.89889	**.79230**	.90082	**.79583**	.90273	**.79934**	.90462	**.80282**	54
8+17	9.89697	**0.78881**	9.89892	**0.79236**	9.90085	**0.79589**	9.90276	**0.79940**	9.90465	**0.80288**	52
10	.89701	**.78887**	.89896	**.79242**	.90088	**.79595**	.90279	**.79945**	.90468	**.80294**	50
12+18	.89704	**.78893**	.89899	**.79248**	.90092	**.79601**	.90282	**.79951**	.90471	**.80299**	48
14	.89707	**.78899**	.89902	**.79254**	.90095	**.79607**	.90286	**.79957**	.90475	**.80305**	46
16+19	9.89710	**0.78905**	9.89905	**0.79260**	9.90098	**0.79612**	9.90289	**0.79963**	9.90478	**0.80311**	44
18	.89714	**.78911**	.89908	**.79266**	.90101	**.79618**	.90292	**.79969**	.90481	**.80317**	42
20+20	.89717	**.78917**	.89912	**.79271**	.90104	**.79624**	.90295	**.79974**	.90484	**.80323**	40
22	.89720	**.78923**	.89915	**.79277**	.90108	**.79630**	.90298	**.79980**	.90487	**.80328**	38
24+21	9.89723	**0.78928**	9.89918	**0.79283**	9.90111	**0.79636**	9.90301	**0.79986**	9.90490	**0.80334**	36
26	.89727	**.78934**	.89921	**.79289**	.90114	**.79642**	.90305	**.79992**	.90493	**.80340**	34
28+22	.89730	**.78940**	.89925	**.79295**	.90117	**.79648**	.90308	**.79998**	.90496	**.80346**	32
30	.89733	**.78946**	.89928	**.79301**	.90120	**.79653**	.90311	**.80004**	.90499	**.80351**	30
32+23	9.89736	**0.78952**	9.89931	**0.79307**	9.90124	**0.79659**	9.90314	**0.80009**	9.90503	**0.80357**	28
34	.89740	**.78958**	.89934	**.79313**	.90127	**.79665**	.90317	**.80015**	.90506	**.80363**	26
36+24	.89743	**.78964**	.89938	**.79319**	.90130	**.79671**	.90320	**.80021**	.90509	**.80369**	24
38	.89746	**.78970**	.89941	**.79325**	.90133	**.79677**	.90324	**.80027**	.90512	**.80375**	22
40+15	9.89749	**0.78976**	9.89944	**0.79330**	9.90136	**0.79683**	9.90327	**0.80033**	.990515	**0.80380**	20
42	.89753	**.78982**	.89947	**.79336**	.90140	**.79688**	.90330	**.80038**	.90518	**.80386**	18
44+26	.89756	**.78988**	.89950	**.79342**	.90143	**.79694**	.90333	**.80044**	.90521	**.80392**	16
46	.89759	**.78994**	.89954	**.79348**	.90146	**.79700**	.90336	**.80050**	.90524	**.80398**	14
48+27	9.89763	**0.79000**	.9.89957	**0.79354**	9.90149	**0.79706**	9.90339	**0.80056**	9.90527	**0.80403**	12
50	.89766	**.79006**	.89960	**.79360**	.90152	**.79712**	.90342	**.80062**	.90531	**.80409**	10
52+28	.89769	**.79011**	.89963	**.79366**	.90356	**.79718**	.90346	**.80068**	.90534	**.80415**	8
54	.89772	**.79017**	.89966	**.79372**	.90159	**.79724**	.90349	**.80073**	.90537	**.80421**	6
56+29	9.89776	**0.79023**	9.89970	**0.79377**	9.90162	**0.79729**	9.90352	**0.80079**	9.90540	**0.80427**	4
58	.89779	**.79029**	.89973	**.79383**	.90165	**.79735**	.90355	**.80085**	.90543	**.80432**	2
60+30	9.89782	**0.79035**	9.89976	**0.79389**	9.90168	**0.79741**	9.90358	**0.80091**	9.90546	**0.80438**	0
	$15^h\,38^m$		$15^h\,36^m$		$15^h\,34^m$		$15^h\,32^m$		$15^h\,30^m$		

TABLE 45.

Haversines.

		$8^h\ 30^m$ 127° 30′		$8^h\ 32^m$ 128° 0′		$8^h\ 34^m$ 128° 30′		$8^h\ 36^m$ 129° 0′		$8^h\ 38^m$ 129° 30′		
s	′	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	0	9.90546	**0.80438**	9.90732	**0.80783**	9.90916	**0.81126**	9.91098	**0.81466**	9.91277	**0.81804**	60
2		.90549	**.80444**	.90735	**.80789**	.90919	**.81131**	.91101	**.81472**	.91280	**.81810**	58
4	+ 1	.90552	**.80450**	.90738	**.80795**	.90922	**.81137**	.91104	**.81477**	.91283	**.81815**	56
6		.90556	**.80455**	.90741	**.80800**	.90925	**.81143**	.91107	**.81483**	.91286	**.81821**	54
8	+ 2	9.90559	**0.80461**	9.90744	**0.90806**	9.90928	**0.81148**	9.91110	**0.81489**	9.91289	**0.81826**	52
10		.90562	**.80467**	.90747	**.80812**	.90931	**.81154**	.91113	**.81494**	.91292	**.81832**	50
12	+ 3	.90565	**.80473**	.90751	**.80817**	.90934	**.81160**	.91116	**.81500**	.91295	**.81838**	48
14		.90568	**.80478**	.90754	**.80823**	.90937	**.81165**	.91119	**.81506**	.91298	**.81843**	46
16	+ 4	9.90571	**0.80484**	9.90757	**0.80829**	9.90940	**0.81171**	9.91122	**0.81511**	9.91301	**0.81849**	44
18		.90574	**.80490**	.90760	**.80835**	.90943	**.81177**	.91125	**.81517**	.91304	**.81854**	42
20	+ 5	.90577	**.80496**	.90763	**.80840**	.90946	**.81183**	.91128	**.81523**	.91307	**.81860**	40
22		.90580	**.80502**	.90766	**.80846**	.90949	**.81188**	.91131	**.81528**	.91310	**.81866**	38
24	+ 6	9.90584	**0.80507**	9.90769	**0.80852**	9.90952	**0.81194**	9.91134	**0.81534**	9.91313	**0.81871**	36
26		.90587	**.80513**	.90772	**.80858**	.90955	**.81200**	.91137	**.81539**	.91316	**.81877**	34
28	+ 7	.90590	**.80519**	.90775	**.80863**	.90958	**.81205**	.91140	**.81545**	.91319	**.81882**	32
30		.90593	**.80525**	.90778	**.80869**	.90962	**.81211**	.91143	**.81551**	.91322	**.81888**	30
32	+ 8	9.90596	**0.80530**	9.90781	**0.80875**	9.90965	**0.81217**	9.91146	**0.81556**	9.91325	**0.81894**	28
34		.90599	**.80536**	.90784	**.80880**	.90968	**.81222**	.91149	**.81562**	.91328	**.81899**	26
36	+ 9	.90602	**.80542**	.90787	**.80886**	.90971	**.81228**	.91152	**.81568**	.91331	**.81905**	24
38		.90605	**.80548**	.90790	**.80892**	.90974	**.81234**	.91155	**.81573**	.91334	**.81910**	22
40	+10	9.90608	**0.80553**	9.90794	**0.80898**	9.90977	**0.81239**	9.91158	**0.81579**	9.91337	**0.81916**	20
42		.90611	**.80559**	.90797	**.80903**	.90980	**.81245**	.91161	**.81585**	.91340	**.81922**	18
44	+11	.90615	**.80565**	.90800	**.80909**	.90983	**.81251**	.91164	**.81590**	.91343	**.81927**	16
46		.90618	**.80571**	.90803	**.80915**	.90986	**.81256**	.91167	**.81596**	.91346	**.81933**	14
48	+12	9.90621	**0.80576**	9.90806	**0.80920**	9.90989	**0.81262**	9.91170	**0.81601**	9.91349	**0.81938**	12
50		.90624	**.80582**	.90809	**.80926**	.90992	**.81268**	.91173	**.81607**	.91352	**.81944**	10
52	+13	.90627	**.80588**	.90812	**.80932**	.90995	**.81273**	.91176	**.81613**	.91355	**.81950**	8
54		.90630	**.80594**	.90815	**.80938**	.90998	**.81279**	.91179	**.81618**	.91358	**.81955**	6
56	+14	9.90633	**0.80599**	9.90818	**0.80943**	9.91001	**0.81285**	9.91182	**0.81624**	9.91361	**0.81961**	4
58		9.90636	**0.80605**	9.90821	**0.80949**	9.91004	**0.81291**	9.91185	**0.81630**	9.91364	**0.81966**	2
		$15^h\ 29^m$		$15^h\ 27^m$		$15^h\ 25^m$		$15^h\ 23^m$		$15^h\ 21^m$		

s	′	$8^h\ 31^m$ 127° 30′		$8^h\ 33^m$ 128° 0′		$8^h\ 35^m$ 128° 30′		$8^h\ 37^m$ 129° 0′		$8^h\ 39^m$ 129° 30′		s
0	+15	9.90639	**0.80611**	9.90824	**0.80955**	9.91007	**0.81296**	9.91188	**0.81635**	9.91367	**0.81972**	60
2		.90642	**.80617**	.90827	**.80960**	.91010	**.81302**	.91191	**.81641**	.91369	**.81978**	58
4	+16	.90646	**.80622**	.90830	**.80966**	.91013	**.81308**	.91194	**.81647**	.91372	**.81983**	56
6		.90646	**.80628**	.90833	**.80972**	.91016	**.81313**	.91197	**.81652**	.91375	**.81989**	54
8	+17	9.90652	**0.80634**	9.90836	**0.80978**	9.91019	**0.81319**	9.91200	**0.81658**	9.91378	**0.81994**	52
10		.90655	**.80640**	.90840	**.80983**	.91022	**.81325**	.91203	**.81663**	.91381	**.82000**	50
12	+18	.90658	**.80645**	.90843	**.80989**	.91025	**.81330**	.91206	**.81669**	.91384	**.82005**	48
14		.90661	**.80651**	.90846	**.80995**	.91028	**.81336**	.91209	**.81675**	.91387	**.82011**	46
16	+19	9.90664	**0.80657**	9.90849	**0.81000**	9.91031	**0.81342**	9.91212	**0.81680**	9.91390	**0.82017**	44
18		.90667	**.80663**	.90852	**.81006**	.91034	**.81347**	.91215	**.81686**	.91393	**.82022**	42
20	+20	.90670	**.80668**	.90855	**.81012**	.91037	**.81353**	.91218	**.81692**	.91396	**.82028**	40
22		.90673	**.80674**	.90858	**.81017**	.91040	**.81359**	.91221	**.81697**	.91399	**.82033**	38
24	+21	9.90676	**0.80680**	9.90861	**0.81023**	9.91043	**0.81364**	9.91224	**0.81703**	9.91402	**0.82039**	36
26		.90680	**.80686**	.90864	**.81029**	.91046	**.81370**	.91227	**.81708**	.91405	**.82045**	34
28	+22	.90683	**.80691**	.90867	**.81035**	.91049	**.81376**	.91230	**.81714**	.91408	**.82050**	32
30		.90686	**.80697**	.90870	**.81040**	.91052	**.81381**	.91233	**.81720**	.91411	**.82056**	30
32	+23	9.90689	**0.80703**	9.90873	**0.81046**	9.91055	**0.81387**	9.91236	**0.81725**	9.91414	**0.82061**	28
34		.90692	**.80709**	.90876	**.81052**	.91058	**.81392**	.91239	**.81731**	.91417	**.82067**	26
36	+24	.90695	**.80714**	.90879	**.81057**	.91061	**.81398**	.91242	**.81737**	.91420	**.82072**	24
38		.90698	**.80720**	.90882	**.81063**	.91064	**.81404**	.91245	**.81742**	.91423	**.82078**	22
40	+25	9.90701	**0.80726**	9.90885	**0.81068**	9.91067	**0.81409**	9.91248	**0.81748**	9.91426	**0.82084**	20
42		.90704	**.80731**	.90888	**.81074**	.91071	**.81415**	.91251	**.81753**	.91429	**.82089**	18
44	+26	.90707	**.80737**	.90892	**.81080**	.91074	**.81421**	.91254	**.81759**	.91432	**.82095**	16
46		.90710	**.80743**	.90895	**.81086**	.91077	**.81426**	.91257	**.81765**	.91435	**.82100**	14
48	+27	9.90714	**0.80749**	9.90898	**0.81092**	9.91080	**0.81432**	9.91260	**0.81770**	9.91437	**0.82106**	12
50		.90717	**.80754**	.90901	**.81097**	.91083	**.81438**	.91263	**.81776**	.91440	**.82112**	10
52	+28	.90720	**.80760**	.90904	**.81103**	.91086	**.81443**	.91265	**.81781**	.91443	**.82117**	8
54		.90723	**.80766**	.90907	**.81109**	.91089	**.81449**	.91268	**.81787**	.91446	**.82123**	6
56	+29	9.90726	**0.80772**	9.90910	**0.81114**	9.91092	**0.81455**	9.91271	**0.81793**	9.91449	**0.82128**	4
58		.90729	**.80777**	.90913	**.81120**	.91095	**.81460**	.91274	**.81798**	.91452	**.82134**	2
60	+30	9.90732	**0.80783**	9.90916	**0.81126**	9.91098	**0.81466**	9.91277	**0.81804**	9.91455	**0.82139**	0
		$15^h\ 28^m$		$15^h\ 26^m$		$15^h\ 24^m$		$15^h\ 22^m$		$15^h\ 20^m$		

TABLE 45.

Haversines.

s '	$8^h 40^m$ 130° 0′		$8^h 42^m$ 130° 30′		$8^h 44^m$ 131° 0′		$8^h 46^m$ 131° 30′		$8^h 48^m$ 132° 0′		s
	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0 0	9.91455	0.82139	9.91631	0.82472	9.91805	0.82803	9.91976	0.83131	9.92146	0.83457	60
2	.91458	.82145	.91634	.82478	.91807	.82808	.91979	.83136	.92149	.83462	58
4+ 1	.91461	.82151	.91637	.82483	.91810	.82814	.91982	.83142	.92152	.83467	56
6	.91464	.82156	.91640	.82489	.91813	.82819	.91985	.83147	.92154	.83473	54
8+ 2	9.91467	0.82162	9.91643	0.82495	9.91816	0.82825	9.91988	0.83153	9.92157	0.83478	52
10	.91470	.82167	.91645	.82500	.91819	.82830	.91991	.83158	.92160	.83484	50
12+ 4	.91473	.82173	.91648	.82506	.91822	.82836	.91993	.83164	.92163	.83489	48
14	.91476	.82178	.91651	.82511	.91825	.82841	.91996	.83169	.92166	.83494	46
16+ 4	9.91479	0.82184	9.91654	0.82517	9.91828	0.82847	9.91999	0.83175	9.92169	0.83500	44
18	.91482	.82189	.91657	.82522	.91830	.82852	.92002	.83180	.92171	.83505	42
20+ 5	.91485	.82195	.91660	.82528	.91833	.82858	.92005	.83185	.92174	.83511	40
22	.91488	.82200	.91663	.82533	.91836	.82863	.92008	.83191	.92177	.83516	38
24+ 6	9.91490	0.82206	9.91666	0.82539	9.91839	0.82869	9.92010	0.83196	9.92180	0.83521	36
26	.91493	.82212	.91669	.82544	.91842	.82874	.92013	.83202	.92183	.83527	34
28+ 7	.91496	.82217	.91672	.82550	.91845	.82880	.92016	.83207	.92185	.83532	32
30	.91499	.82223	.91674	.82555	.91848	.82885	.92019	.83213	.92188	.83538	30
32+ 8	9.91502	0.82228	9.91677	0.82561	9.91851	0.82891	9.92022	0.83218	9.92191	0.83543	28
34	.91505	.82234	.91680	.82566	.91853	.82896	.92025	.83224	.92194	.83548	26
36+ 9	.91508	.82240	.91683	.82572	.91856	.82902	.92027	.83229	.92197	.83554	24
38	.91511	.82245	.91686	.82577	.91859	.82907	.92030	.83234	.92199	.83559	22
40+10	9.91514	0.82251	9.91689	0.82583	9.91862	0.82913	9.92033	0.83240	9.92202	0.83564	20
42	.91517	.82256	.91692	.82588	.91865	.82918	.92036	.83245	.92205	.83570	18
44+11	.91520	.82262	.91695	.82594	.91868	.82924	.92039	.83251	.92208	.83575	16
46	.91523	.82267	.91698	.82599	.91871	.82929	.92042	.83256	.92211	.83581	14
48+12	9.91526	0.82273	9.91701	0.82605	9.91874	0.82934	9.92044	0.83262	9.92213	0.83586	12
50	.91529	.82278	.91703	.82610	.91876	.82940	.92047	.83267	.92216	.83591	10
52+13	.91532	.82284	.91706	.82616	.91879	.82945	.92050	.83272	.92219	.83597	8
54	.91534	.82290	.91709	.82621	.91882	.82951	.92053	.83278	.92222	.83602	6
56+14	9.91537	0.82295	9.91712	0.82627	9.91885	0.82956	9.92056	0.83283	9.92225	0.83608	4
58	9.91540	0.82301	9.91715	0.82632	9.91888	0.82962	9.92059	0.83289	9.92227	0.83613	2
	$15^h 19^m$		$15^h 17^m$		$15^h 15^m$		$15^h 13^m$		$15^h 11^m$		

s '	$8^h 41^m$ 130° 0′		$8^h 43^m$ 130° 30′		$8^h 45^m$ 131° 0′		$8^h 47^m$ 131° 30:		$8^h 49^m$ 132° 0′		s
0+15	9.91543	0.82306	9.91718	0.82638	9.91891	0.82967	9.92061	0.83294	9.92230	0.83618	60
2	.91546	.82312	.91721	.82644	.91894	.82973	.92064	.83300	.92233	.83624	58
4+16	.91549	.82317	.91724	.82649	.91896	.82978	.92067	.83305	.92236	.83629	56
6	.91552	.82323	.91727	.82655	.91899	.82984	.92070	.83310	.92239	.83635	54
8+17	9.91555	0.82328	9.91730	0.82660	9.91902	0.82989	9.92073	0.83316	9.92241	0.83640	52
10	.91558	.82334	.91732	.82666	.91905	.82995	.92076	.83321	.92244	.83645	50
12+18	.91561	.82339	.91735	.82671	.91908	.83000	.92078	.83327	.92247	.83651	48
14	.91564	.82345	.91738	.82677	.91911	.83006	.92081	.83332	.92250	.83656	46
16+19	9.91567	0.82351	9.91741	0.82682	9.91914	0.83011	9.92084	0.83337	9.92253	0.83661	44
18	.91570	.82356	.91744	.82688	.91916	.83016	.92087	.83343	.92255	.83667	42
20+20	.91573	.82362	.91747	.82693	.91919	.83022	.92090	.83348	.92258	.83672	40
22	.91575	.82367	.91750	.82699	.91922	.83027	.92093	.83354	.92261	.83678	38
24+21	9.91578	0.82373	9.91753	0.82704	9.91925	0.83033	9.92095	0.83359	9.92264	0.83683	36
26	.91581	.82378	.91756	.82710	.91928	.83038	.92098	.83365	.92266	.83688	34
28+22	.91584	.82384	.91758	.82715	.91931	.83044	.92101	.83370	.92269	.83694	32
30	.91587	.82389	.91761	.82721	.91934	.83049	.92104	.83375	.92272	.83699	30
32+23	9.91590	0.82395	9.91764	0.82726	9.91936	0.83055	9.92107	0.83381	9.92275	0.83704	28
34	.91593	.82400	.91767	.82732	.91939	.83060	.92109	.83386	.92278	.83710	26
36+24	.91596	.82406	.91770	.82737	.91942	.83066	.92112	.83392	.92280	.83715	24
38	.91599	.82412	.91773	.82743	.91945	.83071	.92115	.83397	.92283	.83720	22
40+25	9.91602	0.82417	9.91776	0.82748	9.91948	0.83077	9.92118	0.83402	9.92286	0.83726	20
42	.91605	.82423	.91779	.82754	.91951	.83082	.92121	.83408	.92289	.83731	18
44+26	.91608	.82428	.91782	.82759	.91954	.83087	.92124	.83413	.92292	.83737	16
46	.91610	.82434	.91784	.82765	.91956	.83093	.92126	.83419	.92294	.83742	14
48+27	9.91613	0.82439	9.91787	0.82770	9.91959	0.83098	9.92129	0.83424	9.92297	0.83747	12
50	.91616	.82445	.91790	.82776	.91962	.83104	.92132	.83430	.92300	.83753	10
52+28	.91619	.82450	.91793	.82781	.91965	.83109	.92135	.83435	.92303	.83758	8
54	.91622	.82456	.91796	.82786	.91968	.83115	.92138	.83440	.92305	.83763	6
56+29	9.91625	0.82461	9.91799	0.82792	9.91971	0.83120	9.92140	0.83446	9.92308	0.83769	4
58	.91628	.82467	.91802	.82797	.91973	.83126	.92143	.83451	.92311	.83774	2
60+30	9.91631	0.82472	9.91805	0.82803	9.91976	0.83131	9.92146	0.83457	9.92314	0.83780	0
	$15^h 18^m$		$15^h 16^m$		$15^h 14^m$		$15^h 12^m$		$15^h 10^m$		

TABLE 45.

Haversines.

		$8^h 50^m$ 132° 30′		$8^h 52^m$ 133° 0′		$8^h 54^m$ 133° 30′		$8^h 56^m$ 134° 0′		$8^h 58^m$ 134° 30′		
s	′	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	0	9.92314	0.83780	9.92480	0.84100	9.92643	0.84418	9.92805	0.84733	9.92965	0.85045	60
2		.92317	.83785	.92482	.84105	.92646	.84423	.92808	.84738	.92968	.85051	58
4+	1	.92319	.83790	.92485	.84111	.92649	.84428	.92811	.84743	.92970	.85056	56
6		.92322	.83796	.92488	.84116	.92652	.84434	.92813	.84749	.92973	.85061	54
8+	2	9.92325	0.83801	9.92491	0.84121	9.92654	0.84439	9.92816	0.84754	9.92975	0.85066	52
10		.92328	.83806	.92493	.84127	.92657	.84444	.92819	.84759	.92978	.85071	50
12+	3	.92330	.83812	.92496	.84132	.92660	.84449	.92821	.84764	.92981	.85077	48
14		.92333	.83817	.92499	.84137	.92662	.84455	.92824	.84770	.92984	.85082	46
16+	4	9.92336	0.83822	9.92502	0.84142	9.92665	0.84460	9.92827	0.84775	9.92986	0.85087	44
18		.92339	.83828	.92504	.84148	.92668	.84465	.92829	.84780	.92989	.85092	42
20+	5	.92342	.83833	.92507	.84153	.92670	.84470	.92832	.84785	.92992	.85097	40
22		.92344	.83838	.92510	.84158	.92673	.84476	.92835	.84790	.92994	.85102	38
24+	6	9.92347	0.83844	9.92512	0.84164	9.92676	0.84481	9.92837	0.84796	9.92997	0.85108	36
26		.92350	.83849	.92515	.84169	.92679	.84486	.92840	.84801	.93001	.85113	34
28+	7	.92353	.83855	.92518	.84174	.92681	.84492	.92843	.84806	.93002	.85118	32
30		.92355	.83860	.92521	.84180	.92684	.84497	.92845	.84811	.93005	.85123	30
32+	8	9.92358	0.83865	9.92523	0.84185	9.92687	0.84502	9.92848	0.84817	9.93007	0.85128	28
34		.92361	.83871	.92526	.84190	.92689	.84507	.92851	.84822	.93010	.85134	26
36+	9	.92364	.83876	.92529	.84196	.92692	.84513	.92853	.84827	.93013	.85139	24
38		.92366	.83881	.92532	.84201	.92695	.84518	.92856	.84832	.93015	.85144	22
40+	10	9.92369	0.83887	9.92534	0.84206	9.92698	0.84523	9.92859	0.84837	9.93018	0.85149	20
42		.92372	.83892	.92537	.84211	.92700	.84528	.92861	.84843	.93021	.85154	18
44+	11	.92375	.83897	.92540	.84217	.92703	.84534	.92864	.84848	.93023	.85159	16
46		.92378	.83903	.92543	.84222	.92706	.84539	.92867	.84853	.93026	.85165	14
48+	12	9.92380	0.83908	9.92545	0.84227	9.92708	0.84544	9.92869	0.84858	9.93029	0.85170	12
50		.92383	.83913	.92548	.84233	.92711	.84549	.92872	.84863	.93031	.85175	10
52+	13	.92386	.83919	.92551	.84238	.92714	.84555	.92875	.84869	.93034	.85180	8
54		.92389	.83924	.92554	.84243	.92716	.84560	.92877	.84874	.93036	.85185	6
56+	14	9.92391	0.83929	9.92556	0.84249	9.92719	0.84565	9.92880	0.84879	9.93039	0.85190	4
58		9.92394	0.83935	9.92559	0.84254	9.92722	0.84570	9.92883	0.84884	9.93042	0.85196	2
		$15^h 9^m$		$15^h 7^m$		$15^h 5^m$		$15^h 3^m$		$15^h 1^m$		

s	′	$8^h 51^m$ 132° 30′		$8^h 53^m$ 133° 0′		$8^h 55^m$ 133° 30′		$8^h 57^m$ 134° 0′		$8^h 59^m$ 134° 30′		s
0+	15	9.92397	0.83940	9.92562	0.84259	9.92725	0.84576	9.92885	0.84890	9.93044	0.85201	60
2		.92400	.83945	.92564	.84264	.92727	.84581	.92888	.84895	.93047	.85206	58
4+	16	.92402	.83951	.92567	.84270	.92730	.84586	.92891	.84900	.93050	.85211	56
6		.92405	.83956	.92570	.84275	.92733	.84591	.92893	.84905	.93052	.85216	54
8+	17	9.92408	0.83961	9.92573	0.84280	9.92735	0.84597	9.92896	0.84910	9.93055	0.85221	52
10		.92411	.83967	.92575	.84286	.92738	.84602	.92899	.84916	.93057	.85227	50
12+	18	.92413	.83972	.92578	.84291	.92741	.84607	.92901	.84921	.93060	.85232	48
14		.92416	.83977	.92581	.84296	.92743	.84612	.92904	.84926	.93063	.85237	46
16+	19	9.92419	0.83983	9.92584	0.84302	9.92746	0.84618	9.92907	0.84931	9.93065	0.85242	44
18		.92422	.83988	.92586	.84307	.92749	.84623	.92909	.84936	.93068	.85247	42
20+	20	.92425	.83993	.92589	.84312	.92751	.84628	.92912	.84942	.93071	.85252	40
22		.92427	.83999	.92592	.84317	.92754	.84633	.92915	.84947	.93073	.85258	38
24+	21	9.92430	0.84004	9.92594	0.84323	9.92757	0.84639	9.92917	0.84952	9.93076	0.85263	36
26		.92433	.84009	.92597	.84328	.92760	.84644	.92920	.84957	.93079	.85268	34
28+	22	.92436	.84015	.92600	.84333	.92762	.84649	.92923	.84962	.93081	.85273	32
30		.92438	.84020	.92603	.84339	.92765	.84654	.92925	.84968	.93084	.85278	30
32+	23	9.92441	0.84025	9.92605	0.84344	9.92768	0.84660	9.92928	0.84973	9.93086	0.85283	28
34		.92444	.84031	.92608	.84349	.92770	.84665	.92931	.84978	.93089	.85288	26
36+	24	.92447	.84036	.92611	.84354	.92773	.84670	.92933	.84983	.93092	.85294	24
38		.92449	.84041	.92613	.84360	.92776	.84675	.92936	.84988	.93094	.85299	22
40+	25	9.92452	0.84047	9.92616	0.84365	9.92778	0.84681	9.92939	0.84994	9.93097	0.85304	20
42		.92455	.84052	.92619	.84370	.92781	.84686	.92941	.84999	.93100	.85309	18
44+	26	.92458	.84057	.92622	.84376	.92784	.84691	.92944	.85004	.93102	.85314	16
46		.92460	.84063	.92624	.84381	.92786	.84696	.92947	.85009	.93105	.85319	14
48+	27	9.92463	0.84068	9.92627	0.84386	9.92789	0.84702	9.92949	0.85014	9.93107	0.85324	12
50		.92466	.84073	.92630	.84391	.92792	.84707	.92952	.85020	.93110	.85330	10
52+	28	.92469	.84079	.92633	.84397	.92794	.84712	.92955	.85025	.93113	.85335	8
54		.92471	.84084	.92635	.84402	.92797	.84717	.92957	.85030	.93115	.85340	6
56+	29	9.92474	0.84089	9.92638	0.84407	9.92800	0.84722	9.92960	0.85035	9.93118	0.85345	4
58		.92477	.84095	.92641	.84412	.92802	.84728	.92962	.85040	.93120	.85350	2
60+	30	9.92480	0.84100	9.92643	0.84418	9.92805	0.84733	9.92965	0.85045	9.93123	0.85355	0
		$15^h 8^m$		$15^h 6^m$		$15^h 4^m$		$15^h 2^m$		$15^h 0^m$		

TABLE 45.

Haversines.

		$9^h\ 0^m$ 135°		$9^h\ 4^m$ 136°		$9^h\ 8^m$ 137°		$9^h\ 12^m$ 138°		$9^h\ 16^m$ 139°		
s	′	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	0	9.93123	0.85355	9.93433	0.85967	9.93736	0.86568	9.94030	0.87157	9.94318	0.87735	60
4	1	.93128	.85366	.93438	.85977	.93741	.86578	.94035	.87167	.94322	.87745	56
8	2	.93134	.85376	.93443	.85987	.93746	.86588	.94040	.87177	.94327	.87755	52
12	3	.93139	.85386	.93448	.85997	.93751	.86597	.94045	.87186	.94332	.87764	48
16	4	9.93144	0.85396	9.93454	0.86007	9.93755	0.86607	9.94050	0.87196	9.94336	0.87774	44
20	5	.93149	.85407	.93459	.86017	.93760	.86617	.94055	.87206	.94341	.87783	40
24	6	.93154	.85417	.93464	.86028	.93765	.86627	.94059	.87216	.94346	.87793	36
28	7	.93160	.85427	.93469	.86038	.93770	.86637	.94064	.87225	.94351	.87802	32
32	8	9.93165	0.85438	9.93474	0.86048	9.93775	0.86647	9.94069	0.87235	9.94355	0.87812	28
36	9	.93170	.85448	.93479	.86058	.93780	.86657	.94074	.87245	.94360	.87821	24
40	10	.93175	.85458	.93484	.86068	.93785	.86667	.94079	.87254	.94365	.87831	20
44	11	.93181	.85468	.93489	.86078	.93790	.86677	.94084	.87264	.94369	.87840	16
48	12	9.93186	0.85479	9.93494	0.86088	9.93795	0.86686	9.94088	0.87274	9.94374	0.87850	12
52	13	.93191	.85489	.93499	.86098	.93800	.86696	.94093	.87283	.94379	.87859	8
56	14	9.93196	0.85499	9.93504	0.86108	9.93805	0.86706	9.94098	0.87293	9.94383	0.87869	4
		$14^h\ 59^m$		$14^h\ 55^m$		$14^h\ 51^m$		$14^h\ 47^m$		$14^h\ 43^m$		

s	′	$9^h\ 1^m$ 135°		$9^h\ 5^m$ 136°		$9^h\ 9^m$ 137°		$9^h\ 13^m$ 138°		$9^h\ 17^m$ 139°		s
0	15	9.93201	0.85509	9.93509	0.86118	9.93810	0.86716	9.94103	0.87303	9.94388	0.87878	60
4	16	.93207	.85520	.93515	.86128	.93815	.86726	.94108	.87313	.94393	.87888	56
8	17	.93212	.85530	.93520	.86138	.93820	.86736	.94112	.87322	.94398	.87897	52
12	18	.93217	.85540	.93525	.86148	.93825	.86746	.94117	.87332	.94402	.87907	48
16	19	9.93222	0.85550	9.93530	0.86158	9.93830	0.86756	9.94122	0.87342	9.94407	0.87916	44
20	20	.93227	.85560	.93535	.86168	.93835	.86765	.94127	.87351	.94412	.87926	40
24	21	.93232	.85571	.93540	.86178	.93840	.86775	.94132	.87361	.94416	.87935	36
28	22	.93238	.85581	.93545	.86189	.93845	.86785	.94137	.87371	.94421	.87945	32
32	23	9.93243	0.85591	9.93550	0.86199	9.93849	0.86795	9.94141	0.87380	9.94426	0.87954	28
36	24	.93248	.85601	.93555	.86209	.93854	.86805	.94146	.87390	.94430	.87964	24
40	25	.93253	.85612	.93560	.86219	.93859	.86815	.94151	.87400	.94435	.87973	20
44	26	.93258	.85622	.93565	.86229	.93864	.86825	.94156	.87409	.94440	.87983	16
48	27	9.93264	0.85632	9.93570	0.86239	9.93869	0.86834	9.94161	0.87419	9.94444	0.87992	12
52	28	.93269	.85642	.93575	.86249	.93874	.86844	.94165	.87428	.94449	.88001	8
56	29	9.93274	0.85652	9.93580	0.86259	9.93879	0.86854	9.94170	0.87438	9.94454	0.88011	4
		$14^h\ 58^m$		$14^h\ 54^m$		$14^h\ 50^m$		$14^h\ 46^m$		$14^h\ 42^m$		

s	′	$9^h\ 2^m$ 135°		$9^h\ 6^m$ 136°		$9^h\ 10^m$ 137°		$9^h\ 14^m$ 138°		$9^h\ 18^m$ 139°		s
0	30	9.93279	0.85663	9.93585	0.86296	9.93884	0.86864	9.94175	0.87448	9.94458	0.88020	60
4	31	.93284	.85673	.93590	.86279	.93889	.86874	.94180	.87457	.94463	.88030	56
8	32	.93289	.85683	.93595	.86289	.93894	.86884	.94184	.87467	.94468	.88039	52
12	33	.93295	.85693	.93600	.86299	.93899	.86893	.94189	.87477	.94472	.88049	48
16	34	9.93300	0.85703	9.93605	0.86309	9.93904	0.86903	9.94194	0.87486	9.94477	0.88058	44
20	35	.93305	.85713	.93611	.86319	.93908	.86913	.94199	.87496	.94482	.88068	40
24	36	.93310	.85724	.93616	.86329	.93913	.86923	.94204	.87505	.94486	.88077	36
28	37	.93315	.85734	.93621	.86339	.93918	.86933	.94208	.87515	.94491	.88086	32
32	38	9.93320	0.85744	9.93626	0.86349	9.93923	0.86942	9.94213	0.87525	9.94496	0.88096	28
36	39	.93326	.85754	.93631	.86359	.93928	.86952	.94218	.87534	.94500	.88105	24
40	40	.93331	.85764	.93636	.86369	.93933	.86962	.94223	.87544	.94505	.88115	20
44	41	.93336	.85774	.93641	.86379	.93938	.86972	.94227	.87554	.94509	.88124	16
48	42	9.93341	0.85785	9.93646	0.86389	9.93943	0.86982	9.94232	0.87563	9.94514	0.88133	12
52	43	.93346	.85795	.93651	.86399	.93948	.86991	.94237	.87573	.94519	.88143	8
56	44	9.93351	0.85805	9.93656	0.86409	9.93952	0.87001	9.94242	0.87582	9.94523	0.88152	4
		$14^h\ 57^m$		$14^h\ 53^m$		$14^h\ 49^m$		$14^h\ 45^m$		$14^h\ 41^m$		

s	′	$9^h\ 3^m$ 135°		$9^h\ 7^m$ 136°		$9^h\ 11^m$ 137°		$9^h\ 15^m$ 138°		$9^h\ 19^m$ 139°		s
0	45	9.93356	0.85815	9.93661	0.86419	9.93957	0.87011	9.94246	0.87592	9.94528	0.88162	60
4	46	.93362	.85825	.93666	.86429	.93962	.87021	.94251	.87602	.94533	.88171	56
8	47	.93367	.85835	.93671	.86438	.93967	.87030	.94256	.87611	.94537	.88180	52
12	48	.93372	.85846	.93676	.86448	.93972	.87040	.94261	.87621	.94542	.88190	48
16	49	9.93377	0.85856	9.93681	0.86458	9.93977	0.87050	9.94265	0.87630	9.94546	0.88199	44
20	50	.93382	.85866	.93686	.86468	.93982	.87060	.94270	.87640	.94551	.88209	40
24	51	.93387	.85876	.93691	.86478	.93987	.87070	.94275	.87649	.94556	.88218	36
28	52	.93392	.85886	.93696	.86488	.93991	.87079	.94280	.87659	.94560	.88227	32
32	53	9.93397	0.85896	9.93701	0.86498	9.93996	0.87089	9.94284	0.87669	9.94565	0.88237	28
36	54	.93403	.85906	.93706	.86508	.94001	.87099	.94289	.87678	.94570	.88246	24
40	55	.93408	.85916	.93711	.86518	.94006	.87109	.94294	.87688	.94574	.88255	20
44	56	.93413	.85926	.93716	.86528	.94011	.87118	.94299	.87697	.94579	.88265	16
48	57	9.93418	0.85937	9.93721	0.86538	9.94016	0.87128	9.94303	0.87707	9.94583	0.88274	12
52	58	.93423	.85947	.93726	.86548	.94021	.87138	.94308	.87716	.94588	.88284	8
56	59	.93428	.85957	.93731	.86558	.94026	.87148	.94313	.87726	.94593	.88293	4
60	60	9.93433	0.85967	9.93736	0.86568	9.94030	0.87157	9.94318	0.87735	9.94597	0.88302	0
		$14^h\ 56^m$		$14^h\ 52^m$		$14^h\ 48^m$		$14^h\ 44^m$		$14^h\ 40^m$		

TABLE 45.

Haversines.

		$9^h 20^m$	140°	$9^h 24^m$	141°	$9^h 28^m$	142°	$9^h 32^m$	143°	$9^h 36^m$	144°	
s	′	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	0	9.94597	0.88302	9.94869	0.88857	9.95134	0.89401	9.95391	0.89932	9.95641	0.90451	60
4	1	.94602	.88312	.94874	.88866	.95138	.89409	.95396	.89941	.95645	.90459	56
8	2	.94606	.88321	.94878	.88876	.95143	.89418	.95400	.89949	.95649	.90468	52
12	3	.94611	.88330	.94883	.88885	.95147	.89427	.95404	.89958	.95654	.90476	48
16	4	9.94616	0.88340	9.94887	0.88894	9.95151	0.89436	9.95408	0.89967	9.95658	0.90485	44
20	5	.94620	.88349	.94892	.88903	.95156	.89445	.95412	.89976	.95662	.90494	40
24	6	.94625	.88358	.94896	.88912	.95160	.89454	.95417	.89984	.95666	.90502	36
28	7	.94629	.88368	.94901	.88921	.95164	.89463	.95421	.89993	.95670	.90511	32
32	8	9.94634	0.88377	9.94905	0.88930	9.95169	0.89472	9.95425	0.90002	9.95674	0.90519	28
36	9	.94638	.88386	.94909	.88940	.95173	.89481	.95429	.90010	.95678	.90528	24
40	10	.94643	.88396	.94914	.88949	.95177	.89490	.95433	.90019	.95682	.90537	20
44	11	.94648	.88405	.94918	.88958	.95182	.89499	.95438	.90028	.95686	.90545	16
48	12	9.94652	0.88414	9.94923	0.88967	9.95186	0.89508	9.95442	0.90037	9.95690	0.90553	12
52	13	.94657	.88423	.94927	.88976	.95190	.89517	.95446	.90045	.95694	.90562	8
56	14	9.94661	0.88433	9.94932	0.88985	9.95195	0.89526	9.95450	0.90054	9.95699	0.90570	4
		$14^h 39^m$		$14^h 35^m$		$14^h 31^m$		$14^h 27^m$		$14^h 23^m$		

s	′	$9^h 21^m$	140°	$9^h 25^m$	141°	$9^h 29^m$	142°	$9^h 33^m$	143°	$9^h 37^m$	144°	s
0	15	9.94666	0.88442	9.94936	0.88994	9.95199	0.89534	9.95454	0.90063	9.95703	0.90579	60
4	16	.94670	.88451	.94941	.89003	.95203	.89543	.95459	.90071	.97507	.90588	56
8	17	.94675	.88461	.94945	.89012	.95208	.89552	.95463	.90080	.95711	.90596	52
12	18	.94680	.88470	.94950	.89022	.95212	.89561	.95467	.90089	.95715	.90604	48
16	19	9.94684	0.88479	9.94954	0.89031	9.95216	0.89570	9.95471	0.90097	9.95719	0.90613	44
20	20	.94689	.88489	.94958	.89040	.95221	.89579	.95475	.90106	.95723	.90621	40
24	21	.94693	.88498	.94963	.89049	.95225	.89588	.95480	.90115	.95727	.90630	36
28	22	.94698	.88507	.94967	.89058	.95229	.89597	.95484	.90124	.95731	.90638	32
32	23	9.94702	0.88516	9.94972	0.89007	o.95234	0.89606	9.95488	0.90132	9.95735	0.90647	28
36	24	.94707	.88526	.94976	.89076	.95238	.89614	.95492	.90141	.95739	.90655	24
40	25	.94711	.88535	.94981	.89085	.95242	.89623	.95496	.90150	.95743	.90664	20
44	26	.94716	.88544	.94985	.89094	.95246	.89632	.95501	.90158	.95747	.90672	16
48	27	9.94721	0.88553	9.94989	0.89103	9.95251	0.89641	9.95505	0.90167	9.95751	0.90680	12
52	28	.94725	.88563	.94994	.89112	.95255	.89650	.95509	.90176	.95755	.90689	8
56	29	9.94730	0.88572	9.94998	0.89121	9.95259	0.89659	9.95513	0.90184	9.95759	0.90697	4
		$14^h 38^m$		$14^h 34^m$		$14^h 30^m$		$14^h 26^m$		$14^h 22^m$		

s	′	$9^h 22^m$	140°	$9^h 26^m$	141°	$9^h 30^m$	142°	$9^h 34^m$	143°	$9^h 38^m$	144°	s
0	30	9.94734	0.88581	9.95003	0.89130	9.95264	0.89668	9.95517	0.90193	9.95763	0.90706	60
4	31	.94739	.88590	.95007	.89139	.95268	.89677	.95521	.90201	.95768	.90714	56
8	32	.94743	.88600	.95011	.89149	.95272	.89685	.95526	.90210	.95772	.90723	52
12	33	.94748	.88609	.95016	.89158	.95276	.89694	.95530	.90219	.95776	.90731	48
16	34	9.94752	0.88618	9.95020	0.89167	9.95281	0.89703	9.95534	0.90227	9.95780	0.90740	44
20	35	.94757	.88627	.95025	.89176	.95285	.89712	.95538	.90236	.95784	.90748	40
24	36	.94761	.88637	.95029	.89185	.95289	.89721	.95542	.90245	.95788	.90756	36
28	37	.94766	.88646	.95033	.89194	.95294	.89730	.95546	.90253	.95792	.90765	32
32	38	9.94770	0.88655	9.95038	0.89203	9.95298	0.89738	9.95550	0.90262	9.95796	0.90773	28
36	39	.94774	.88664	.95042	.89212	.95302	.89747	.95555	.90271	.95800	.90792	24
40	40	.94779	.88674	.95047	.89221	.95306	.89756	.95559	.90279	.95804	.90790	20
44	41	.94784	.88683	.95051	.89230	.95311	.89765	.95563	.90288	.95808	.90798	16
48	42	9.94788	0.88692	9.95055	0.89239	9.95315	0.89774	9.95567	0.90296	9.95812	0.90807	12
52	43	.94793	.88701	.95060	.89248	.95319	.89783	.95571	.90305	.95816	.90815	8
56	44	9.94797	0.88710	9.95064	0.89257	9.95323	0.89791	9.95575	0.90314	9.95820	0.90824	4
		$14^h 37^m$		$14^h 33^m$		$14^h 29^m$		$14^h 25^m$		$14^h 21^m$		

s	′	$9^h 23^m$	140°	$9^h 27^m$	141°	$9^h 31^m$	142°	$9^h 35^m$	143°	$9^h 39^m$	144°	s
0	45	9.94802	0.88720	9.95069	0.89266	9.95328	0.89800	9.95579	0.90322	9.95824	0.90832	60
4	46	.94806	.88729	.95073	.89275	.95332	.89809	.95584	.90331	.95828	.90840	56
8	47	.94811	.88738	.95077	.89284	.95336	.89818	.95588	.90339	.95832	.90849	52
12	48	.94815	.88747	.95082	.89293	.95340	.89827	.95592	.90348	.95836	.90857	48
16	49	9.94820	0.88756	9.95086	0.89302	9.75345	0.89835	9.95596	0.90357	9.95840	0.90866	44
20	50	.94824	.88766	.95090	.89311	.95349	.89844	.95600	.90365	.95844	.90874	40
24	51	.94829	.88775	.95095	.89320	.95353	.89853	.95604	.90374	.95848	.90882	36
28	52	.94833	.88784	.95099	.89329	.95357	.89862	.95608	.90382	.95852	.90891	32
32	53	9.94838	0.88793	9.95104	0.89338	9.95362	0.89870	9.95613	0.90391	.9 95856	0.90899	28
36	54	.94842	.88802	.95108	.89347	.95366	.89879	.95617	.90399	.95860	.90907	24
40	55	.94847	.88811	.95112	.89356	.95370	.89888	.95621	.90408	.95864	.90916	20
44	56	.94851	.88821	.95117	.89365	.95374	.89897	.95625	.90417	.95868	.90924	16
48	57	9.94856	0.88830	9.95121	0.89374	9.95379	0.89906	9.95629	0.90425	9.95872	0.90933	12
52	58	.94860	.88839	.95125	.89383	.95383	.89914	.95633	.90434	.95876	.90941	8
56	59	.94865	.88848	.95130	.89392	.95387	.89923	.95637	.90442	.95880	.90949	4
60	60	9.94869	0.88857	9.95134	0.89401	9.95391	0.89932	9.95641	0.90451	9.95884	0.90958	0
		$14^h 36^m$		$14^h 32^m$		$14^h 28^m$		$14^h 24^m$		$14^h 20^m$		

TABLE 45.

Haversines.

s	′	$9^h 40^m$	145°	$9^h 44^m$	146°	$9^h 48^m$	147°	$9^h 52^m$	148°	$9^h 56^m$	149°	s
s	′	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	**0**	9.95884	**0.90958**	9.96119	**0.91452**	9.96347	**0.91934**	9.96568	**0.92402**	9.96782	**0.92858**	60
4	**1**	.95888	**.90966**	.96123	**.91469**	.96351	**.91941**	.96572	**.92410**	.96786	**.92666**	56
8	**2**	.95892	**.90974**	.96127	**.91468**	.96355	**.91949**	.96576	**.92418**	.96789	**.92873**	52
12	**3**	.95896	**.90983**	.96131	**.91476**	.96359	**.91957**	.96579	**.92426**	.96793	**.92881**	48
16	**4**	9.95900	**0.90991**	9.96135	**0.91484**	9.96362	**0.91965**	9.96583	**0.92433**	9.96796	**0.92888**	44
20	**5**	.95904	**.90999**	.96139	**.91493**	.96366	**.91973**	.96586	**.92441**	.96800	**.92896**	40
24	**6**	.95908	**.91008**	.96142	**.91501**	.96370	**.91981**	.96590	**.92449**	.96803	**.92903**	36
28	**7**	.95912	**.91016**	.96146	**.91509**	.96374	**.91989**	.96594	**.92456**	.96807	**.92911**	32
32	**8**	9.95916	**0.91024**	9.96150	**0.91517**	9.96377	**0.91997**	9.96597	**0.92464**	9.96810	**0.92918**	28
36	**9**	.95920	**.91033**	.96154	**.91525**	.96381	**.92005**	.96601	**.92472**	.96814	**.92926**	24
40	**10**	.95924	**.91041**	.96158	**.91533**	.96385	**.92013**	.96604	**.92479**	.96817	**.92933**	20
44	**11**	.95928	**.91049**	.96162	**.91541**	.96388	**.92020**	.96608	**.92487**	.96821	**.92941**	16
48	**12**	9.95932	**0.91057**	9.96165	**0.91549**	9.96392	**0.92028**	9.96612	**0.92495**	9.96824	**0.92948**	12
52	**13**	.95936	**.91066**	.96169	**.91557**	.96396	**.92036**	.96615	**.92502**	.96827	**.92955**	8
56	**14**	9.95939	**0.91074**	9.96173	**0.91565**	9.96400	**0.92044**	9.96619	**0.92510**	9.96831	**0.92963**	4
		$14^h 19^m$		$14^h 15^m$		$14^h 11^m$		$14^h 7^m$		$14^h 3^m$		

s	′	$9^h 41^m$	145°	$9^h 45^m$	146°	$9^h 49^m$	147°	$9^h 53^m$	148°	$9^h 57^m$	149°	s
0	**15**	9.95943	**0.91082**	9.96177	**0.91574**	9.96403	**0.92052**	9.96622	**0.92518**	9.96834	**0.92970**	60
4	**16**	.95947	**.91091**	.96181	**.91582**	.96407	**.92060**	.96626	**.92525**	.96837	**.92978**	56
8	**17**	.95951	**.91099**	.96185	**.91590**	.96411	**.92068**	.96630	**.92533**	.96841	**.92985**	52
12	**18**	.95955	**.91107**	.96188	**.91598**	.96412	**.92076**	.96633	**.92541**	.96845	**.92993**	48
16	**19**	9.95959	**0.91115**	9.96192	**0.91606**	9.96418	**0.92083**	9.96637	**0.92548**	9.96848	**0.93000**	44
20	**20**	.95963	**.91124**	.96196	**.91614**	.96422	**.92091**	.96640	**.92556**	.96852	**.93007**	40
24	**21**	.95967	**.91132**	.96200	**.91622**	.96426	**.92099**	.96644	**.92563**	.96855	**.93015**	36
28	**22**	.95971	**.91140**	.96204	**.91630**	.96429	**.92107**	.96648	**.92571**	.96859	**.93022**	32
32	**23**	9.95975	**0.91149**	9.96208	**0.91638**	9.96433	**0.92115**	9.96651	**0.92579**	9.96862	**0.93030**	28
36	**24**	.95979	**.91157**	.96211	**.91646**	.96437	**.92123**	.96655	**.92586**	.96866	**.93037**	24
40	**25**	.95983	**.91165**	.96215	**.91654**	.96440	**.92130**	.96658	**.92594**	.96869	**.93045**	20
44	**26**	.95987	**.91173**	.96219	**.91662**	.96444	**.92138**	.96662	**.92602**	.96873	**.93052**	16
48	**27**	9.95991	**0.91182**	9.96223	**0.91670**	9.96448	**0.92146**	9.96665	**0.92609**	9.96876	**0.93059**	12
52	**28**	.95995	**.91190**	.96227	**.91678**	.96451	**.92154**	.96669	**.92617**	.96879	**.93067**	8
56	**29**	9.95999	**0.91198**	9.96230	**0.91686**	9.96455	**0.92162**	9.96673	**0.92624**	9.96883	**0.93074**	4
		$14^h 18^m$		$14^h 14^m$		$14^h 10^m$		$14^h 6^m$		$14^h 2^m$		

s	′	$9^h 42^m$	145°	$9^h 46^m$	146°	$9^h 50^m$	147°	$9^h 54^m$	148°	$9^h 58^m$	149°	s
0	**30**	9.96002	**0.91206**	9.96234	**0.91694**	9.96459	**0.92170**	9.96676	**0.92632**	9.96886	**0.93081**	60
4	**31**	.96006	**.91215**	.96238	**.91702**	.96462	**.92177**	.96680	**.92640**	.96890	**.93089**	56
8	**32**	.96010	**.91223**	.96242	**.91710**	.96466	**.92185**	.96683	**.92647**	.96894	**.93096**	52
12	**33**	.96014	**.91231**	.96246	**.91718**	.96470	**.92193**	.96687	**.92655**	.96897	**.93104**	48
16	**34**	9.96018	**0.91239**	9.96249	**0.91726**	9.96473	**0.92201**	9.96690	**0.92662**	9.96900	**0.93111**	44
20	**35**	.96022	**.91247**	.96253	**.91734**	.96477	**.92209**	.96994	**.92670**	.96904	**.93118**	40
24	**36**	.96026	**.91256**	.96257	**.91742**	.96481	**.92216**	.96697	**.92678**	.96907	**.93126**	36
28	**37**	.96030	**.91264**	.96261	**.91750**	.96484	**.92224**	.96701	**.92685**	.96910	**.93133**	32
32	**38**	9.96034	**0.91272**	9.96265	**0.91758**	9.96488	**0.92232**	9.96705	**0.92693**	9.96914	**0.93140**	28
36	**39**	.96038	**.91280**	.96268	**.91766**	.96492	**.92240**	.96708	**.92700**	.96917	**.93148**	24
40	**40**	.96042	**.91289**	.96272	**.91774**	.96495	**.92248**	.96712	**.92708**	.96921	**.93155**	20
44	**41**	.96046	**.91297**	.96276	**.91782**	.96499	**.92255**	.96715	**.92715**	.96924	**.93162**	16
48	**42**	9.96049	**0.91305**	9.96280	**0.91790**	9.96503	**0.92263**	9.96719	**0.92723**	9.96928	**0.93170**	12
52	**44**	.96053	**.91313**	.96283	**.91798**	.96506	**.92271**	.96722	**.92731**	.96931	**.93177**	8
56	**44**	9.96057	**0.91321**	9.96287	**0.91806**	9.96510	**0.92279**	9.96726	**0.92738**	9.96934	**0.93184**	4
		$14^h 17^m$		$14^h 13^m$		$14^h 9^m$		$14^h 5^m$		$14^h 1^m$		

s	′	$9^h 43^m$	145°	$9^h 47^m$	146°	$9^h 51^m$	147°	$9^h 55^m$	148°	$9^h 59^m$	149°	s
0	**45**	9.96061	**0.91329**	9.96291	**0.91814**	9.96514	**0.92286**	9.96729	**0.92746**	9.96938	**0.93192**	60
4	**46**	.96065	**.91338**	.96295	**.91822**	.96517	**.92294**	.96733	**.92753**	.96941	**.93199**	56
8	**47**	.96069	**.91346**	.96299	**.91830**	.96521	**.92302**	.96736	**.92761**	.96945	**.93206**	52
12	**48**	.96073	**.91354**	.96302	**.91838**	.96525	**.92310**	.96740	**.92768**	.96948	**.93214**	48
16	**49**	9.96077	**0.91362**	9.96306	**0.91846**	9.96528	**0.92317**	9.96743	**0.92776**	9.96951	**0.93221**	44
20	**50**	.96081	**.91370**	.96310	**.91854**	.96532	**.92325**	.96747	**.92783**	.96955	**.93228**	40
24	**51**	.96084	**.91379**	.96314	**.91862**	.96536	**.92333**	.96750	**.92791**	.96958	**.93236**	36
28	**52**	.96088	**.91387**	.96317	**.91870**	.96539	**.92341**	.96754	**.92798**	.96962	**.93243**	32
32	**53**	9.96092	**0.91395**	9.96321	**0.91878**	9.96543	**0.92348**	9.96758	**0.92806**	9.96965	**0.93250**	28
36	**54**	.96096	**.91403**	.96325	**.91886**	.96547	**.92356**	.98761	**.92813**	.96968	**.93258**	24
40	**55**	.96100	**.91411**	.96329	**.91894**	.96550	**.92364**	.96765	**.92821**	.96972	**.93265**	20
44	**56**	.96104	**.91419**	.96332	**.91902**	.96554	**.92372**	.96768	**.92828**	.96975	**.93272**	16
48	**57**	9.96108	**0.91427**	9.96336	**0.91910**	9.96557	**0.92379**	9.96772	**0.92836**	9.96979	**0.93279**	12
52	**58**	.96112	**.91436**	.96340	**.91918**	.96561	**.92387**	.96775	**.92843**	.96982	**.93287**	8
50	**59**	.96115	**.91444**	.96344	**.91926**	.96565	**.92394**	.96779	**.92851**	.96985	**.93294**	4
60	**60**	9.96119	**0.91452**	9.96347	**0.91934**	9.96568	**0.92402**	9.96782	**0.92858**	9.96989	**0.93301**	0
		$14^h 16^m$		$14^h 12^m$		$14^h 8^m$		$14^h 4^m$		$14^h 0^m$		

TABLE 45.

Haversines.

s	′	10h 0m 150°		10h 4m 151°		10h 8m 152°		10h 12m 153°		10h 16m 154°		s
		Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	0	9.96989	**0.93301**	9.97188	**0.93731**	9.97381	**0.94147**	9.97566	**0.94550**	9.97745	**0.94940**	60
4	1	.96992	**.93309**	.97192	**.93738**	.97384	**.94154**	.97569	**.95557**	.97748	**.94946**	56
8	2	.96996	**.93316**	.97195	**.93745**	.97387	**.94161**	.97572	**.94564**	.97751	**.94952**	52
12	3	.96999	**.93323**	.97198	**.93752**	.97390	**.94168**	.97575	**.94570**	.97754	**.94959**	48
16	4	9.97002	**0.93330**	9.97201	**0.93759**	9.97393	**0.94175**	9.97578	**0.94577**	9.97756	**0.94965**	44
20	5	.97006	**.93338**	.97205	**.93766**	.97397	**.94181**	.97581	**.94583**	.97759	**.94972**	40
24	6	.97009	**.93345**	.97208	**.93773**	.97400	**.94188**	.97584	**.94590**	.97762	**.94978**	36
28	7	.97012	**.93352**	.97211	**.93780**	.97403	**.94195**	.97587	**.94596**	.97765	**.94984**	32
32	8	9.97016	**0.93359**	9.97214	**0.93787**	9.97406	**0.94202**	9.97591	**0.94603**	9.97768	**0.94991**	28
36	9	.97019	**.93367**	.97218	**.93794**	.97409	**.94209**	.97594	**.94610**	.97771	**.94997**	24
40	10	.97022	**.93374**	.97221	**.93801**	.97412	**.94215**	.97597	**.94616**	.97774	**.95003**	20
44	11	.97026	**.93381**	.97224	**.93808**	.97415	**.94222**	.97600	**.94623**	.97777	**.95010**	16
48	12	9.97029	**0.93388**	9.97227	**0.93815**	9.97418	**0.94229**	9.97603	**0.94629**	9.97780	**0.95016**	12
52	13	.97033	**.93395**	.97231	**.93822**	.97422	**.94236**	.97606	**.94636**	.97783	**.95022**	8
56	14	9.97036	**0.93403**	9.97234	**0.93829**	9.97425	**0.94243**	9.97609	**0.94642**	9.97785	**0.95029**	4
		13h 59m		13h 55m		13h 51m		13h 47m		13h 43m		

s	′	10h 1m 150°		10h 5m 151°		10h 9m 152°		10h 13m 153°		10h 17m 154°		s
0	15	9.97039	**0.93410**	9.97237	**0.93836**	9.97428	**0.94249**	9.97612	**0.94649**	9.97788	**0.95035**	60
4	16	.97043	**.93417**	.97240	**.93843**	.97431	**.94256**	.97615	**.94655**	.97791	**.95041**	56
8	17	.97046	**.93424**	.97244	**.93850**	.97434	**.94263**	.97618	**.94662**	.97794	**.95048**	52
12	18	.97049	**.93432**	.97247	**.93857**	.97437	**.94270**	.97621	**.94669**	.97797	**.95054**	48
16	19	9.97052	**0.93439**	9.97250	**0.93864**	9.97440	**0.94276**	9.97624	**0.94675**	9.97800	**0.95060**	44
20	20	.97056	**.93446**	.97253	**.93871**	.97443	**.94283**	.97627	**.94682**	.97803	**.95066**	40
24	21	.97059	**.93453**	.97257	**.93878**	.97447	**.94290**	.97630	**.94688**	.97806	**.95073**	36
28	22	.97063	**.93460**	.97260	**.93885**	.97450	**.94297**	.97633	**.94695**	.97808	**.95079**	32
32	23	9.97066	**0.93468**	9.97263	**0.93892**	9.97453	**0.94303**	9.97636	**0.94701**	9.97811	**0.95085**	28
36	24	.97069	**.93475**	.97266	**.93899**	.97456	**.94310**	.97639	**.94708**	.97814	**.95092**	24
40	25	.97073	**.93482**	.97269	**.93906**	.97459	**.94317**	.97642	**.94714**	.97817	**.95098**	20
44	26	.97076	**.93489**	.97273	**.93913**	.97462	**.94324**	.97645	**.94721**	.97820	**.95104**	16
48	27	9.97079	**0.93496**	9.97276	**0.93920**	9.97465	**0.94330**	9.97647	**0.94727**	9.97823	**0.95111**	12
52	28	.97083	**.93503**	.97279	**.93927**	.97468	**.94337**	.97650	**.94734**	.97826	**.95117**	8
56	29	9.97086	**0.93511**	9.97282	**0.93934**	9.97471	**0.94344**	9.97653	**0.94740**	9.97829	**0.95123**	4
		13h 58m		13h 54m		13h 50m		13h 46m		13h 42m		

s	′	10h 2m 150°		10h 6m 151°		10h 10m 152°		10h 14m 153°		10h 18m 154°		s
0	30	9.97089	**0.93518**	9.97285	**0.93941**	9.97474	**0.94351**	9.97656	**0.94747**	9.97831	**0.95129**	60
4	31	.97093	**.93525**	.97289	**.93948**	.97478	**.94357**	.97659	**.94753**	.97834	**.95136**	56
8	32	.97096	**.93532**	.97292	**.93955**	.97481	**.94364**	.97662	**.94760**	.97837	**.95142**	52
12	33	.97099	**.93539**	.97295	**.93962**	.97484	**.94371**	.97665	**.94766**	.97840	**.95148**	48
16	34	9.97103	**0.93546**	9.97298	**0.93969**	9.97487	**0.94377**	9.97668	**0.94773**	9.97843	**0.95154**	44
20	35	.97106	**.93554**	.97301	**.93976**	.97490	**.94384**	.97671	**.94779**	.97846	**.95161**	40
24	36	.97109	**.93561**	.97305	**.93982**	.97493	**.94391**	.97674	**.94786**	.97849	**.95167**	36
28	37	.97113	**.93568**	.97308	**.93989**	.97496	**.94397**	.97677	**.94792**	.97851	**.95173**	32
32	38	9.97116	**0.93575**	9.97311	**0.93996**	9.97499	**0.94404**	9.97680	**0.94799**	9.97854	**0.95179**	28
36	39	.97119	**.93582**	.97314	**.94003**	.97502	**.94411**	.97683	**.94805**	.97857	**.95185**	24
40	40	.97123	**.93589**	.97317	**.94010**	.97505	**.94418**	.97686	**.94811**	.97860	**.95192**	20
44	41	.97126	**.93596**	.97321	**.94017**	.97508	**.94424**	.97689	**.94818**	.97863	**.95198**	16
48	42	9.97129	**0.93603**	9.97324	**0.94024**	9.97511	**0.94431**	9.97692	**0.94824**	9.97866	**0.95204**	12
52	43	.97132	**.93611**	.97327	**.94031**	.97514	**.94438**	.97695	**.94831**	.97868	**.95210**	8
56	44	9.97136	**0.93618**	9.97330	**0.94038**	9.97518	**0.94444**	9.97698	**0.94837**	9.97871	**0.95217**	4
		13h 57m		13h 53m		13h 49m		13h 45m		13h 41m		

s	′	10h 3m 150°		10h 7m 151°		10h 11m 152°		10h 15m 153°		10h 19m 154°		s
0	45	9.97139	**0.93625**	9.97333	**0.94045**	9.97521	**0.94451**	9.97701	**0.94844**	9.97874	**0.95223**	60
4	46	.97142	**.93632**	.97337	**.94051**	.97524	**.94458**	.97704	**.94850**	.97877	**.95229**	56
8	47	.97146	**.93639**	.97340	**.94058**	.97527	**.94464**	.97707	**.94857**	.97880	**.95235**	52
12	48	.97149	**.93646**	.97343	**.94065**	.97530	**.94471**	.97710	**.94863**	.97883	**.95241**	48
16	49	9.97152	**0.93653**	9.97346	**0.94072**	9.97533	**0.94477**	9.97713	**0.94869**	9.97885	**0.95248**	44
20	50	.97156	**.93660**	.97349	**.94079**	.97536	**.94484**	.97716	**.94876**	.97888	**.95254**	40
24	51	.97159	**.93667**	.97352	**.94086**	.97539	**.94491**	.97718	**.94882**	.97891	**.95260**	36
28	52	.97162	**.93674**	.97356	**.94093**	.97542	**.94497**	.97721	**.94889**	.97894	**.95266**	32
32	53	9.97165	**0.93682**	9.97359	**0.94099**	9.97545	**0.94504**	9.97724	**0.94895**	9.97897	**0.95272**	28
36	54	.97169	**.93689**	.97362	**.94106**	.97548	**.94511**	.97727	**.94901**	.97899	**.95278**	24
40	55	.97172	**.93696**	.97365	**.94113**	.97551	**.94517**	.97730	**.94908**	.97902	**.95285**	20
44	56	.97175	**.93703**	.97368	**.94120**	.97554	**.94524**	.97733	**.94914**	.97905	**.95291**	16
48	57	9.97179	**0.93710**	9.97371	**0.94127**	9.97557	**0.94531**	9.97736	**0.94921**	9.97908	**0.95297**	12
52	58	.97182	**.93717**	.97575	**.94134**	.97560	**.94537**	.97739	**.94927**	.97911	**.95303**	8
56	59	.97185	**.93724**	.97378	**.94141**	.97563	**.94544**	.97742	**.94933**	.97914	**.95309**	4
60	60	9.97188	**0.93731**	9.97381	**0.94147**	9.97566	**0.94550**	9.97745	**0.94940**	9.97916	**0.95315**	0
		13h 56m		13h 52m		13h 48m		13h 44m		13h 40m		

TABLE 45.

Haversines.

s	'	10h 20m 155°		10h 24m 156°		10h 28m 157°		10h 32m 158°		10h 36m 159°		s
		Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	0	9.97916	0.95315	9.98081	0.95677	9.98239	0.96025	9.98389	0.96359	9.98533	0.96679	60
4	1	.97919	.95322	.98084	.95683	.98241	.96031	.98392	.96365	.98536	.96684	56
8	2	.97922	.95328	.98086	.95689	.98244	.96037	.98394	.96370	.98538	.96689	52
12	3	.97925	.95334	.98089	.95695	.98246	.96042	.98397	.96376	.98540	.96695	48
16	4	9.97927	0.95340	9.98092	0.95701	9.98249	0.96048	9.98399	0.96381	9.98543	0.96700	44
20	5	.97930	.95346	.98094	.95707	.98251	.96054	.98402	.96386	.98545	.96705	40
24	6	.97933	.95352	.98097	.95713	.98254	.96059	.98404	.96392	.98547	.96710	36
28	7	.97936	.95358	.98100	.95719	.98256	.96065	.98406	.96397	.98550	.96715	32
32	8	9.97939	0.95364	9.98102	0.95724	9.98259	0.96071	9.98409	0.96403	9.98552	0.96721	28
36	9	.97941	.95371	.98105	.95730	.98262	.96076	.98411	.96408	.98554	.96726	24
40	10	.97944	.95377	.98108	.95736	.98264	.96082	.98414	.96413	.98557	.96731	20
44	11	.97947	.95383	.98110	.95742	.98267	.96088	.98416	.96419	.98559	.96736	16
48	12	9.97950	0.95389	9.98113	0.95748	9.98269	0.96093	9.98419	0.96424	9.98561	0.96741	12
52	13	.97953	.95395	.98116	.95754	.98272	.96099	.98421	.96430	.98564	.96746	8
56	14	9.97955	0.95401	9.98118	0.95760	9.98274	0.96104	9.98424	0.96435	9.98566	0.96752	4
		13h 39m		13h 35m		13h 31m		13h 27m		13h 23m		
s	'	10h 21m 155°		10h 25m 156°		10h 29m 157°		10h 33m 158°		10h 37m 159°		s
0	15	9.97958	0.95407	9.98121	0.95766	9.98277	0.96110	9.98426	0.96440	9.98568	0.96757	60
4	16	.97961	.95413	.98124	.95771	.98279	.96116	.98428	.96446	.98570	.96762	56
8	17	.97964	.95419	.98126	.95777	.98282	.96121	.98431	.96451	.98573	.96767	52
12	18	.97966	.95425	.98129	.95783	.98285	.96127	.98433	.96457	.98575	.96772	48
16	19	9.97969	0.95431	9.98132	0.95789	9.98287	0.96133	9.98436	0.96462	9.98577	0.96777	44
20	20	.97972	.95438	.98134	.95795	.98290	.96138	.98438	.96467	.98580	.96782	40
24	21	.97975	.95444	.98137	.95801	.98292	.96144	.98440	.96473	.98582	.96788	36
28	22	.97977	.95450	.98139	.95806	.98295	.96149	.98443	.96478	.98584	.96793	32
32	23	9.97980	0.95456	9.98142	0.95812	9.98297	0.96155	9.98455	0.96483	9.98587	0.96798	28
36	24	.97983	.95462	.98145	.85818	.98300	.96161	.98448	.96489	.98589	.96803	24
40	25	.97986	.95468	.98147	.95824	.98302	.96166	.98450	.96494	.98591	.96808	20
44	26	.97988	.95474	.98150	.95830	.98305	.96172	.98453	.96500	.98593	.96813	16
48	27	9.97991	0.95480	9.98153	0.95836	9.98307	0.96177	9.98455	0.96505	9.98596	0.96818	12
52	28	.97994	.95486	.98155	.95841	.98310	.96183	.98457	.96510	.98598	.96823	8
56	29	9.97997	0.95492	9.98158	0.95847	9.98312	0.96188	9.98460	0.96516	9.98600	0.96829	4
		13h 38m		13h 34m		13h 30m		13h 26m		13h 22m		
s	'	10h 22m 155°		10h 26m 156°		10h 30m 157°		10h 34m 158°		10h 38m 159°		s
0	30	9.97999	0.95498	9.98161	0.95853	9.98315	0.96194	9.98462	0.96521	9.98603	0.96834	60
4	31	.98002	.95504	.98163	.95859	.98317	.96200	.98465	.96526	.98605	.96839	56
8	32	.98005	.95510	.98166	.95865	.98320	.96205	.98467	.96532	.98607	.96844	52
12	33	.98008	.95516	.98168	.95870	.98322	.96211	.98469	.96537	.98609	.96849	48
16	34	9.98010	0.95522	9.98171	0.95876	9.98325	0.96216	9.98472	0.96542	9.98612	0.96854	44
20	35	.98013	.95528	.98174	.95882	.98327	.96222	.98474	.96547	.98614	.96859	40
24	36	.98016	.95534	.98176	.95888	.98330	.96227	.98476	.96553	.98616	.96864	36
28	37	.98019	.95540	.98179	.95894	.98332	.96223	.98479	.96558	.98619	.96869	32
32	38	9.98021	0.95546	9.98182	0.95899	9.98335	0.96238	9.98481	0.96563	9.98621	0.96874	28
36	39	.98024	.95552	.98184	.95905	.98337	.96244	.98484	.96569	.98623	.96879	24
40	40	.98027	.95558	.98187	.95911	.98340	.96249	.98486	.96574	.98625	.96884	20
44	41	.98030	.95564	.98189	.95917	.98342	.96255	.98488	.96579	.98628	.96889	16
48	42	9.98032	0.95570	9.98192	0.95922	9.98345	0.96260	9.98491	0.96585	9.98630	0.96894	12
52	43	.98035	.95576	.98195	.95928	.98347	.96266	.98493	.96590	.98632	.96899	8
56	44	9.98038	0.95582	9.98197	0.95934	9.98350	0.96272	9.98496	0.96595	9.98634	0.96905	4
		13h 37m		13h 33m		13h 29m		13h 25m		13h 21m		
s	'	10h 23m 155°		10h 27m 156°		10h 31m 157°		10h 35m 158°		10h 39m 159°		s
0	45	9.98040	0.95588	9.98200	0.95940	9.98352	0.96277	9.98498	0.96600	9.98637	0.96910	60
4	46	.98043	.95594	.98202	.95945	.98355	.96283	.98500	.96606	.98639	.96915	56
8	47	.98046	.95600	.98205	.95951	.98357	.96288	.98503	.96611	.98641	.96920	52
12	48	.98049	.95606	.98208	.95957	.98360	.96294	.98505	.96616	.98643	.96925	48
16	49	9.98051	0.95612	9.98210	0.95962	9.98362	0.96299	9.98507	0.96621	9.98646	0.96930	44
20	50	.98054	.95618	.98213	.95968	.98365	.96305	.98510	.96627	.98648	.96935	40
24	51	.98057	.95624	.98215	.95974	.98367	.96310	.98512	.96632	.98650	.96940	36
28	52	.98059	.95630	.98218	.95980	.98370	.96315	.98514	.96637	.98652	.96945	32
32	53	9.98062	0.95636	9.98221	0.95985	9.98372	0.96321	9.98517	0.96642	9.98655	0.96950	28
36	54	.98065	.95642	.98223	.95991	.98375	.96326	.98519	.96648	.98657	.96955	24
40	55	.98067	.95648	.98226	.95997	.98377	.96332	.98521	.96653	.98659	.96960	20
44	56	.98070	.95654	.98228	.96002	.98379	.96337	.98524	.96658	.98661	.96965	16
48	57	9.98073	0.95660	9.98231	0.96008	9.98382	0.96343	9.98526	0.96663	9.98664	0.96970	12
52	58	.98076	.95665	.98233	.96014	.98384	.96348	.98529	.96669	.98666	.96975	8
56	59	.98078	.95671	.98236	.96020	.98387	.96354	.98531	.96674	.98668	.96980	4
60	60	9.98081	0.95677	9.98239	0.96025	9.98389	0.96359	9.98533	0.96679	9.98670	0.96985	0
		13h 36m		13h 32m		13h 28m		13h 24m		13h 20m		

TABLE 45.

Haversines.

s	'	$10^h\,40^m$ 160°		$10^h\,44^m$ 161°		$10^h\,48^m$ 162°		$10^h\,52^m$ 163°		$10^h\,56^m$ 164°		s
		Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	**0**	9.98670	**0.96985**	9.98801	**0.97276**	9.98924	**0.97553**	9.99041	**0.97815**	9.99151	**0.98063**	60
4	**1**	.98673	**.96990**	.98803	**.97281**	.98926	**.97557**	.99043	**.97819**	.99152	**.98067**	56
8	**2**	.98675	**.96995**	.98805	**.97285**	.98928	**.97562**	.99044	**.97824**	.99154	**.98071**	52
12	**3**	.98677	**.97000**	.98807	**.97290**	.98930	**.97566**	.99046	**.97828**	.99156	**.98075**	48
16	**4**	9.98679	**0.97005**	9.98809	**0.97295**	9.98932	**0.97571**	9.99048	**0.97832**	9.99158	**0.98079**	44
20	**5**	.98681	**.97009**	.98811	**.97300**	.98934	**.97575**	.99050	**.97836**	.99159	**.98083**	40
24	**6**	.98684	**.97014**	.98813	**.97304**	.98936	**.97580**	.99052	**.97841**	.99161	**.98087**	36
28	**7**	.98686	**.97019**	.98815	**.97309**	.98938	**.97584**	.99054	**.97845**	.99163	**.98091**	32
32	**8**	9.98688	**0.97024**	9.98817	**0.97314**	9.98940	**0.97589**	9.99056	**0.97849**	9.99165	**0.98095**	28
36	**9**	.98690	**.97029**	.98819	**.97318**	.98942	**.97593**	.99058	**.97853**	.99166	**.98099**	24
40	**10**	.98692	**.97034**	.98822	**.97323**	.98944	**.97598**	.99059	**.97858**	.99168	**.98103**	20
44	**11**	.98695	**.97039**	.98824	**.97328**	.98946	**.97602**	.99061	**.97862**	.99170	**.98107**	16
48	**12**	9.98697	**0.97044**	9.98826	**0.97332**	9.98948	**0.97606**	9.99063	**0.97866**	9.99172	**0.98111**	12
52	**13**	.98699	**.97049**	.98828	**.97337**	.98950	**.97611**	.99065	**.97870**	.99173	**.98115**	8
56	**14**	9.98701	**0.97054**	9.98830	**0.97342**	9.98952	**0.97615**	9.99067	**0.97874**	9.99175	**0.98119**	4
		$13^h\,19^m$		$13^h\,15^m$		$13^h\,11^m$		$13^h\,7^m$		$13^h\,3^m$		

s	'	$10^h\,41^m$ 160°		$10^h\,45^m$ 161°		$10^h\,49^m$ 162°		$10^h\,53^m$ 163°		$10^h\,57^m$ 164°		s
0	**15**	9.98703	**0.97059**	9.98832	**0.97347**	9.98954	**0.97620**	9.99069	**0.97879**	9.99177	**0.98123**	60
4	**16**	.98706	**.97064**	.98834	**.97351**	.98956	**.97624**	.99071	**.97883**	.99179	**.98127**	56
8	**17**	.98708	**.97069**	.98836	**.97356**	.98958	**.97629**	.99072	**.97887**	.99180	**.98131**	52
12	**18**	.98710	**.97074**	.98838	**.97361**	.98960	**.97633**	.99074	**.97891**	.99182	**.98135**	48
16	**19**	9.98712	**0.97078**	9.98840	**0.97365**	9.98962	**0.97637**	9.99076	**0.97895**	9.99184	**0.98139**	44
20	**20**	.98714	**.97083**	.98842	**.97370**	.98964	**.97642**	.99078	**.97899**	.99186	**.98142**	40
24	**21**	.98717	**.97088**	.98845	**.97374**	.98966	**.97646**	.99080	**.97904**	.99187	**.98146**	36
28	**22**	.98719	**.97093**	.98847	**.97379**	.98968	**.97651**	.99082	**.97908**	.99189	**.98150**	32
32	**23**	9.98721	**0.97098**	9.98849	**0.97384**	9.98970	**0.97655**	9.99084	**0.97912**	9.99191	**0.98154**	28
36	**24**	.98723	**.97103**	.98851	**.97388**	.98971	**.97660**	.99085	**.97916**	.99193	**.98158**	24
40	**25**	.98725	**.97108**	.98853	**.97393**	.98973	**.97664**	.99087	**.97920**	.99194	**.98162**	20
44	**26**	.98728	**.97113**	.98855	**.97398**	.98975	**.97668**	.99089	**.97924**	.99196	**.98166**	16
48	**27**	9.98730	**0.97117**	9.98857	**0.97402**	9.98977	**0.97673**	9.99091	**0.97929**	9.99198	**0.98170**	12
52	**28**	.98732	**.97122**	.98859	**.97407**	.98979	**.97677**	.99093	**.97933**	.99200	**.98174**	8
56	**29**	9.98734	**0.97127**	9.98861	**0.97412**	9.98981	**0.97681**	9.99095	**0.97937**	9.99201	**0.98178**	4
		$13^h\,18^m$		$13^h\,14^m$		$13^h\,10^m$		$13^h\,6^m$		$13^h\,2^m$		

s	'	$10^h\,42^m$ 160°		$10^h\,46^m$ 161°		$10^h\,50^m$ 162°		$10^h\,54^m$ 163°		$10^h\,58^m$ 164°		s
0	**30**	9.98736	**0.97132**	9.98863	**0.97416**	9.98983	**0.97686**	9.99096	**0.97941**	9.99203	**0.98182**	60
4	**31**	.98738	**.97137**	.98865	**.97421**	.98985	**.97690**	.99098	**.97945**	.99205	**.98185**	56
8	**32**	.98741	**.97142**	.98867	**.97425**	.98987	**.97695**	.99100	**.97949**	.99206	**.98189**	52
12	**33**	.98743	**.97147**	.98869	**.97430**	.98989	**.97699**	.99102	**.97953**	.99208	**.98193**	48
16	**34**	9.98745	**0.97151**	9.98871	**0.97435**	9.98991	**0.97703**	9.99104	**0.97957**	9.99210	**0.98197**	44
20	**35**	.98747	**.97156**	.98873	**.97439**	.98993	**.97708**	.99106	**.97962**	.99212	**.98201**	40
24	**36**	.98749	**.97161**	.98875	**.97444**	.98995	**.97712**	.99107	**.97966**	.99213	**.98205**	36
28	**37**	.98751	**.97166**	.98877	**.97448**	.98997	**.97716**	.99109	**.97970**	.99215	**.98209**	32
32	**38**	9.98754	**0.97171**	9.98880	**0.97453**	9.98999	**0.97721**	9.99111	**0.97974**	9.99217	**0.98212**	28
36	**39**	.98756	**.97176**	.98882	**.97458**	.99001	**.97725**	.99113	**.97978**	.99218	**.98216**	24
40	**40**	.98758	**.97180**	.98884	**.97462**	.99003	**.97729**	.99115	**.97982**	.99220	**.98220**	20
44	**41**	.98760	**.97185**	.98886	**.97467**	.99004	**.97734**	.99116	**.97986**	.99222	**.98224**	16
48	**42**	9.98762	**0.97190**	9.98888	**0.97471**	9.99006	**0.97738**	9.99118	**0.97990**	9.99223	**0.98228**	12
52	**43**	.98764	**.97195**	.98890	**.97476**	.99008	**.97742**	.99120	**.97994**	.99225	**.98232**	8
56	**44**	9.98766	**0.97200**	9.98892	**0.97480**	9.99010	**0.97747**	9.99122	**0.97998**	9.99227	**0.98236**	4
		$13^h\,17^m$		$13^h\,13^m$		$13^h\,9^m$		$13^h\,5^m$		$13^h\,1^m$		

s	'	$10^h\,43^m$ 160°		$10^h\,47^m$ 161°		$10^h\,51^m$ 162°		$10^h\,55^m$ 163°		$10^h\,59^m$ 164°		s
0	**45**	9.98769	**0.97204**	9.98894	**0.97485**	9.99012	**0.97751**	9.99124	**0.98002**	9.99229	**0.98239**	60
4	**46**	.98771	**.97209**	.98896	**.97490**	.99014	**.97755**	.99126	**.98007**	.99230	**.98243**	56
8	**47**	.98773	**.97214**	.98898	**.97494**	.99016	**.97760**	.99127	**.98011**	.99232	**.98247**	52
12	**48**	.98775	**.97219**	.98900	**.97499**	.99018	**.97764**	.99129	**.98015**	.99234	**.98251**	48
16	**49**	9.98777	**0.97224**	9.98902	**0.97503**	9.99020	**0.97768**	9.99131	**0.98019**	9.99235	**0.98255**	44
20	**50**	98779	**.97228**	.98904	**.97508**	.99022	**.97773**	.99133	**.98023**	.99237	**.98258**	40
24	**51**	.98781	**.97233**	.98906	**.97512**	.99024	**.97777**	.99135	**.98027**	.99239	**.98262**	36
28	**52**	.98784	**.97238**	.98908	**.97517**	.99026	**.97781**	.99136	**.98031**	.99240	**.98266**	32
32	**53**	9.98786	**0.97243**	9.98910	**0.97521**	9.99027	**0.97785**	9.99138	**0.98035**	9.99242	**0.98270**	28
36	**54**	.98788	**.97247**	.98912	**.97526**	.99029	**.97790**	.99140	**.98039**	.99244	**.98274**	24
40	**55**	.98790	**.97252**	.98914	**.97530**	.99031	**.97794**	.99142	**.98043**	.99245	**.98277**	20
44	**56**	.98792	**.97257**	.98916	**.97535**	.99033	**.97798**	.99143	**.98047**	.99247	**.98281**	16
48	**57**	9.98794	**0.97262**	9.98918	**0.97539**	9.99035	**0.97802**	9.99145	**0.98051**	9.99249	**0.98285**	12
52	**58**	.98796	**.97266**	.98920	**.97544**	.99037	**.97807**	.99147	**.98055**	.99250	**.98289**	8
56	**59**	.98798	**.97271**	.98922	**.97548**	.99039	**.97811**	.99149	**.98059**	.99252	**.98293**	4
60	**60**	9.98801	**0.97276**	9.98924	**0.97553**	9.99041	**0.97815**	9.99151	**0.98063**	9.99254	**0.98296**	0
		$13^h\,16^m$		$13^h\,12^m$		$13^h\,8^m$		$13^h\,4^m$		$13^h\,0^m$		

TABLE 45.

Haversines.

s	′	$11^h 0^m$ 165°		$11^h 4^m$ 166°		$11^h 8^m$ 167°		$11^h 12^m$ 168°		$11^h 16^m$ 169°		s
		Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	
0	0	9.99254	**0.98296**	9.99350	**0.98515**	9.99440	**0.98719**	9.99523	**0.98907**	9.99599	**0.99081**	60
4	1	.99255	**.98300**	.99352	**.98518**	.99441	**.98722**	.99524	**.98910**	.99600	**.99084**	56
8	2	.99257	**.98304**	.99353	**.98522**	.99443	**.98725**	.99526	**.98913**	.99602	**.99087**	52
12	3	.99259	**.98308**	.99355	**.98525**	.99444	**.98728**	.99527	**.98916**	.99603	**.99090**	48
16	4	9.99260	**0.98311**	9.99356	**0.98529**	9.99446	**0.98732**	9.99528	**0.98919**	9.99604	**0.99092**	44
20	5	.99262	**.98315**	.99358	**.98532**	.99447	**.98735**	.99529	**.98922**	.99605	**.99095**	40
24	6	.99264	**.98319**	.99359	**.98536**	.99448	**.98738**	.99531	**.98925**	.99606	**.99098**	36
28	7	.99265	**.98323**	.99361	**.98539**	.99450	**.98741**	.99532	**.98928**	.99608	**.99101**	32
32	8	9.99267	**0.98326**	9.99362	**0.98543**	9.99451	**0.98745**	9.99533	**0.98931**	9.99609	**0.99103**	28
36	9	.99269	**.98330**	.99364	**.98546**	.99453	**.98748**	.99535	**.98934**	.99610	**.99106**	24
40	10	.99270	**.98334**	.99366	**.98550**	.99454	**.98751**	.99536	**.98937**	.99611	**.99109**	20
44	11	.99272	**.98337**	.99367	**.98553**	.99456	**.98754**	.99537	**.98940**	.99612	**.99112**	16
48	12	9.99274	**0.98341**	9.99369	**0.98557**	9.99457	**0.98757**	9.99539	**0.98943**	9.99614	**0.99114**	12
52	13	.99275	**.98345**	.99370	**.98560**	.99458	**.98761**	.99540	**.98946**	.99615	**.99117**	8
56	14	9.99277	**0.98349**	9.99372	**0.98564**	9.99460	**0.98764**	9.99541	**0.98949**	9.99616	**0.99120**	4
		$12^h 59^m$		$12^h 55^m$		$12^h 51^m$		$12^h 47^m$		$12^h 43^m$		

s	′	$11^h 1^m$ 165°		$11^h 5^m$ 166°		$11^h 9^m$ 167°		$11^h 13^m$ 168°		$11^h 17^m$ 169°		s
0	15	9.99278	**0.98352**	9.99373	**0.98567**	9.99461	**0.98767**	9.99543	**0.98952**	9.99617	**0.99123**	60
4	16	.99280	**.98356**	.99375	**.98571**	.99463	**.98770**	.99544	**.98955**	.99618	**.99125**	56
8	17	.99282	**.98360**	.99376	**.98574**	.99464	**.98774**	.99545	**.98958**	.99620	**.99128**	52
12	18	.99283	**.98363**	.99378	**.98577**	.99465	**.98777**	.99546	**.98961**	.99621	**.99131**	48
16	19	9.99285	**0.98367**	9.99379	**0.98581**	9.99467	**0.98780**	9.99548	**0.98964**	9.99622	**0.99133**	44
20	20	.99287	**.98371**	.99381	**.98584**	.99468	**.98783**	.99549	**.98967**	.99623	**.99136**	40
24	21	.99288	**.98374**	.99382	**.98588**	.99470	**.98786**	.99550	**.98970**	.99624	**.99139**	36
28	22	.99290	**.98378**	.99384	**.98591**	.99471	**.98789**	.99552	**.98973**	.99626	**.99141**	32
32	23	9.99291	**0.98382**	9.99385	**0.98595**	9.99472	**0.98793**	9.99553	**0.98976**	9.99627	**0.99144**	28
36	24	.99293	**.98385**	.99387	**.98598**	.99474	**.98796**	.99554	**.98979**	.99628	**.99147**	24
40	25	.99295	**.98389**	.99388	**.98601**	.99475	**.98799**	.99555	**.98982**	.99629	**.99149**	20
44	26	.99296	**.98393**	.99390	**.98605**	.99477	**.98802**	.99557	**.98985**	.99630	**.99152**	16
48	27	9.99298	**0.98396**	9.99391	**0.98608**	9.99478	**0.98805**	9.99558	**0.98987**	9.99631	**0.99155**	12
52	28	.99300	**.98400**	.99393	**.98611**	.99479	**.98809**	.99559	**.98990**	.99633	**.99157**	8
56	29	9.99301	**0.98404**	9.99394	**0.98615**	9.99481	**0.98812**	9.99561	**0.98993**	9.99634	**0.99160**	4
		$12^h 58^m$		$12^h 54^m$		$12^h 50^m$		$12^h 46^m$		$12^h 42^m$		

s	′	$11^h 2^m$ 165°		$11^h 6^m$ 166°		$11^h 10^m$ 167°		$11^h 14^m$ 168°		$11^h 18^m$ 169°		s
0	30	9.99303	**0.98407**	9.99396	**0.98619**	9.99482	**0.98815**	9.99562	**0.98996**	9.99635	**0.99163**	60
4	31	.99304	**.98411**	.99397	**.98622**	.99484	**.98818**	.99563	**.98999**	.99636	**.99165**	56
8	32	.99306	**.98415**	.99399	**.98625**	.99485	**.98821**	.99564	**.99002**	.99637	**.99168**	52
12	33	.99308	**.98418**	.99400	**.98629**	.99486	**.98824**	.99566	**.99005**	.99638	**.99171**	48
16	34	9.99309	**0.98422**	9.99402	**0.98632**	9.99488	**0.98827**	9.99567	**0.99008**	9.99639	**0.99173**	44
20	35	.99311	**.98426**	.99403	**.98635**	.99489	**.98830**	.99568	**.99011**	.99641	**.99176**	40
24	36	.99312	**.98429**	.99405	**.98639**	.99490	**.98834**	.99569	**.99014**	.99642	**.99179**	36
28	37	.99314	**.98433**	.99406	**.98642**	.99492	**.98837**	.99571	**.99016**	.99643	**.99181**	32
32	38	9.99316	**0.98436**	9.99408	**0.98646**	9.99493	**0.98840**	9.99572	**0.99019**	9.99644	**0.99184**	28
36	39	.99317	**.98440**	.99409	**.98649**	.99495	**.98843**	.99573	**.99022**	.99645	**.99186**	24
40	40	.99319	**.98444**	.99411	**.98652**	.99496	**.98846**	.99575	**.99025**	.99646	**.99189**	20
44	41	.99320	**.98447**	.99412	**.98656**	.99497	**.98849**	.99576	**.99028**	.99648	**.99192**	16
48	42	9.99322	**0.98451**	9.99414	**0.98659**	9.99499	**0.98852**	9.99577	**0.99031**	9.99649	**0.99194**	12
52	43	.99324	**.98454**	.99415	**.98662**	.99500	**.98855**	.99578	**.99034**	.99650	**.99197**	8
56	44	9.99325	**0.98458**	9.99417	**0.98666**	9.99501	**0.98858**	9.99580	**0.99036**	9.99651	**0.99199**	4
		$12^h 57^m$		$12^h 53^m$		$12^h 49^m$		$12^h 45^m$		$12^h 41^m$		

s	′	$11^h 3^m$ 165°		$11^h 7^m$ 166°		$11^h 11^m$ 167°		$11^h 15^m$ 168°		$11^h 19^m$ 169°		s
0	45	9.99327	**0.98462**	9.99418	**0.98669**	9.99503	**0.98862**	9.99581	**0.99039**	9.99652	**0.99202**	60
4	46	.99328	**.98465**	.99420	**.98672**	.99504	**.98865**	.99582	**.99042**	.99653	**.99205**	56
8	47	.99330	**.98469**	.99421	**.98676**	.99505	**.98868**	.99583	**.99045**	.99654	**.99207**	52
12	48	.99331	**.98472**	.99422	**.98679**	.99507	**.98871**	.99584	**.99048**	.99655	**.99210**	48
16	49	9.99333	**0.98476**	9.99424	**0.98682**	9.99508	**0.98874**	9.99586	**0.99051**	9.99657	**0.99212**	44
20	50	.99335	**.98479**	.99425	**.98686**	.99510	**.98877**	.99587	**.99053**	.99658	**.99215**	40
24	51	.99336	**.98483**	.99427	**.98689**	.99511	**.98880**	.99588	**.99056**	.99659	**.99217**	36
28	52	.99338	**.98487**	.99429	**.98692**	.99512	**.98883**	.99589	**.99059**	.99660	**.99220**	32
32	53	9.99339	**0.98490**	9.99430	**0.98696**	9.99514	**0.98886**	9.99591	**0.99062**	9.99661	**0.99223**	28
36	54	.99341	**.98494**	.99431	**.98699**	.99515	**.98889**	.99592	**.99065**	.99662	**.99225**	24
40	55	.99342	**.98497**	.99433	**.98702**	.99516	**.98892**	.99593	**.99067**	.99663	**.99228**	20
44	56	.99344	**.98501**	.99434	**.98705**	.99518	**.98895**	.99594	**.99070**	.99664	**.99230**	16
48	57	9.99345	**0.98504**	9.99436	**0.98709**	9.99519	**0.98898**	9.99596	**0.99073**	9.99666	**0.99233**	12
52	58	.99347	**.98508**	.99437	**.98712**	.99520	**.98901**	.99597	**.99076**	.99667	**.99235**	8
56	59	.99349	**.98511**	.99438	**.98715**	.99522	**.98904**	.99598	**.99079**	.99668	**.99238**	4
60	60	9.99350	**0.98515**	9.99440	**0.98719**	9.99523	**0.98907**	9.99599	**0.99081**	9.99669	**0.99240**	0
		$12^h 56^m$		$12^h 52^m$		$12^h 48^m$		$12^h 44^m$		$12^h 40^m$		

TABLE 45.

Haversines.

		$11^h\,20^m$	170°	$11^h\,24^m$	171°	$11^h\,28^m$	172°	$11^h\,32^m$	173°	$11^h\,36^m$	174°	
s	′	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s
0	0	9.99669	0.99240	9.99732	0.99384	9.99788	0.99513	9.99838	0.99627	9.99881	0.99726	60
4	1	.99670	.99243	.99733	.99387	.99789	.99515	.99839	.99629	.99882	.99728	56
8	2	.99671	.99245	.99734	.99389	.99790	.99517	.99839	.99631	.99882	.99729	52
12	3	.99672	.99248	.99735	.99391	.99791	.99519	.99840	.99633	.99883	.99731	48
16	4	9.99673	0.99250	9.99736	0.99393	9.99792	0.99521	9.99841	0.99634	9.99884	0.99732	44
20	5	.99674	.99253	.99737	.99396	.99793	.99523	.99842	.99636	.99884	.99734	40
24	6	.99675	.99255	.99738	.99398	.99793	.99525	.99842	.99638	.99885	.99735	36
28	7	.99677	.99258	.99739	.99400	.99794	.99527	.99843	.99640	.99885	.99737	32
32	8	9.99678	0.99260	9.99740	0.99402	9.99795	0.99529	9.99844	0.99641	9.99886	0.99738	28
36	9	.99679	.99263	.99741	.99405	.99796	.99531	.99845	.99643	.99887	.99740	24
40	10	.99680	.99265	.99742	.99407	.99797	.99533	.99845	.99645	.99887	.99741	20
44	11	.99681	.99268	.99743	.99409	.99798	.99535	.99846	.99647	.99888	.99743	16
48	12	9.99682	0.99270	9.99744	0.99411	9.99799	0.99537	9.99847	0.99648	9.99889	0.99744	12
52	13	.99683	.99273	.99745	.99414	.99800	.99539	.99848	.99650	.99889	.99746	8
56	14	9.99684	0.99275	9.99746	0.99416	9.99800	0.99541	9.99848	0.99652	9.99890	0.99747	4
		$12^h\,39^m$		$12^h\,35^m$		$12^h\,31^m$		$12^h\,27^m$		$12^h\,23^m$		
s	′	$11^h\,21^m$	170°	$11^h\,25^m$	171°	$11^h\,29^m$	172°	$11^h\,33^m$	173°	$11^h\,37^m$	174°	s
0	15	9.99685	0.99278	9.99747	0.99418	9.99801	0.99543	9.99849	0.99653	9.99891	0.99748	60
4	16	.99686	.99280	.99748	.99420	.99802	.99545	.99850	.99655	.99891	.99750	56
8	17	.99687	.99283	.99748	.99422	.99803	.99547	.99851	.99657	.99892	.99751	52
12	18	.99688	.99285	.99749	.99425	.99804	.99549	.99851	.99659	.99893	.99753	48
16	19	9.99690	0.99288	9.99750	0.99427	9.99805	0.99551	9.99852	0.99660	9.99893	0.99754	44
20	20	.99691	.99290	.99751	.99429	.99805	.99553	.99853	.99662	.99894	.99756	40
24	21	.99692	.99293	.99752	.99431	.99806	.99555	.99854	.99664	.99894	.99757	36
28	22	.99693	.99295	.99753	.99433	.99807	.99557	.99854	.99665	.99895	.99759	32
32	23	9.99694	0.99297	9.99754	0.99436	9.99808	0.99559	9.99855	0.99667	9.99896	0.99760	28
36	24	.99695	.99300	.99755	.99438	.99809	.99561	.99856	.99669	.99896	.99761	24
40	25	.99696	.99302	.99756	.99440	.99810	.99563	.99857	.99670	.99897	.99763	20
44	26	.99697	.99305	.99757	.99442	.99811	.99565	.99857	.99672	.99897	.99674	16
48	27	9.99698	0.99307	9.99758	0.99444	9.99811	0.99567	9.99858	0.99674	9.99898	0.99766	12
52	28	.99699	.99309	.99759	.99446	.99812	.99568	.99859	.99675	.99899	.99767	8
56	29	9.99700	0.99312	9.99760	0.99449	9.99813	0.99570	9.99859	0.99677	9.99899	0.99768	4
		$12^h\,38^m$		$12^h\,34^m$		$12^h\,30^m$		$12^h\,26^m$		$12^h\,22^m$		
s	′	$11^h\,22^m$	170°	$11^h\,26^m$	171°	$11^h\,30^m$	172°	$11^h\,34^m$	173°	$11^h\,38^m$	174°	s
0	30	9.99701	0.99314	9.99761	0.99451	9.99814	0.99572	9.99860	0.99679	9.99900	0.99770	60
4	31	.99702	.99317	.99762	.99453	.99815	.99574	.99861	.99680	.99901	.99771	56
8	32	.99703	.99319	.99763	.99455	.99815	.99576	.99862	.99682	.99901	.99773	52
12	33	.99704	.99321	.99764	.99457	.99816	.99578	.99862	.99684	.99902	.99774	48
16	34	9.99705	0.99324	9.99765	0.99459	9.99817	0.99580	9.99863	0.99685	9.99902	0.99775	44
20	35	.99706	.99326	.99766	.99461	.99818	.99582	.99864	.99687	.99903	.99777	40
24	36	.99707	.99329	.99766	.99464	.99819	.99584	.99864	.99688	.99904	.99778	36
28	37	.99708	.99331	.99767	.99466	.99820	.99585	.99865	.99690	.99904	.99780	32
32	38	9.99710	0.99333	9.99768	0.99468	9.99820	0.99587	9.99866	0.99692	9.99905	0.99781	28
36	39	.99711	.99336	.99769	.99470	.99821	.99589	.99867	.99693	.99905	.99782	24
40	40	.99712	.99338	.99770	.99472	.99822	.99591	.99867	.99695	.99906	.99784	20
44	41	.99713	.99340	.99771	.99474	.99823	.99593	.99868	.99696	.99906	.99785	16
48	42	9.99714	0.99343	9.99772	0.99476	9.99824	0.99595	9.99869	0.99698	9.99907	0.99786	12
52	43	.99715	.99345	.99773	.90478	.99824	.99597	.99869	.99700	.99908	.99788	8
56	44	9.99716	0.99347	9.99774	0.99480	9.99825	0.99598	9.99870	0.99701	9.99908	0.99789	4
		$12^h\,37^m$		$12^h\,33^m$		$12^h\,29^m$		$12^h\,25^m$		$12^h\,21^m$		
s	′	$11^h\,23^m$	170°	$11^h\,27^m$	171°	$11^h\,31^m$	172°	$11^h\,35^m$	173°	$11^h\,39^m$	174°	s
0	45	9.99717	0.99350	9.99774	0.99483	9.99826	0.99600	9.99871	0.99703	9.99909	0.99790	60
4	46	.99718	.99352	.99775	.99485	.99827	.99602	.99871	.99704	.99909	.99792	56
8	47	.99719	.99354	.99776	.99487	.99828	.99604	.99872	.99706	.99910	.99793	52
12	48	.99720	.99357	.99777	.99489	.99828	.99606	.99873	.99708	.99911	.99794	48
16	49	9.99721	0.99359	9.99778	0.99491	9.99829	0.99608	9.99874	0.99709	9.99911	0.99796	44
20	50	.99722	.99361	.99779	.99493	.99830	.99609	.99874	.99711	.99912	.99797	40
24	51	.99723	.99364	.99780	.99495	.99831	.99611	.99875	.99712	.99912	.99798	36
28	52	.99724	.99366	.99781	.99497	.99832	.99613	.99876	.99714	.99913	.99799	32
32	53	9.99725	0.99368	9.99782	0.99499	9.99832	0.99615	9.99876	0.99715	9.99913	0.99801	28
36	54	.99726	.99371	.99783	.99501	.99833	.99617	.99877	.99717	.99914	.99802	24
40	55	.99727	.99373	.99784	.99503	.99834	.99618	.99878	.99719	.99915	.99803	20
44	56	.99728	.99375	.99785	.99505	.99835	.99620	.99878	.99720	.99915	.99805	16
48	57	9.99729	0.99378	9.99786	0.99507	9.99836	0.99622	9.99879	0.99722	9.99916	0.99806	12
52	58	.99730	.99380	.99786	.99509	.99836	.99624	.99880	.99723	.99916	.99807	8
56	59	.99731	.99382	.99787	.99511	.99837	.99626	.99880	.99725	.99917	.99808	4
60	60	9.99732	0.99384	9.99788	0.99513	9.99838	0.99627	9.99881	0.99726	9.99917	0.99810	0
		$12^h\,36^m$		$12^h\,32^m$		$12^h\,28^m$		$12^h\,24^m$		$12^h\,20^m$		

TABLE 45.

Haversines.

		$11^h 40^m$	175°	$11^h 44^m$	176°	$11^h 48^m$	177°	$11^h 52^m$	178°	$11^h 56^m$	179°	
s	′	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	Log. Hav.	Nat. Hav.	s.
0	0	9.99917	0.99810	9.99947	0.99878	9.99970	0.99931	9.99987	0.99970	9.99997	0.99992	60
4	1	.99918	.99811	.99948	.99879	.99971	.99932	.99987	.99971	.99997	.99993	56
8	2	.99918	.99812	.99948	.99880	.99971	.99933	.99987	.99971	.99997	.99993	52
12	3	.99919	.99814	.99948	.99881	.99971	.99934	.99987	.99971	.99997	.99993	48
16	4	9.99919	0.99815	9.99949	0.99882	9.99972	0.99934	9.99988	0.99972	9.99997	0.99994	44
20	5	.99920	.99816	.99949	.99883	.99972	.99935	.99988	.99972	.99997	.99994	40
24	6	.99921	.99817	.99950	.99884	.99972	.99936	.99988	.99973	.99997	.99994	36
28	7	.99921	.99819	.99950	.99885	.99973	.99937	.99988	.99973	.99997	.99994	32
32	8	9.99922	0.99820	9.99951	0.99886	9.99973	0.99937	9.99988	0.99973	9.99998	0.99994	28
36	9	.99922	.99821	.99951	.99887	.99973	.99938	.99989	.99974	.99998	.99995	24
40	10	.99923	.99822	.99951	.99888	.99973	.99939	.99989	.99974	.99998	.99995	20
44	11	.99923	.99823	.99952	.99889	.99974	.99940	.99989	.99975	.99998	.99995	16
48	12	9.99924	0.99825	9.99952	0.99890	9.99974	0.99940	9.99989	0.99975	9.99998	0.99995	12
52	13	.99924	.99826	.99953	.99891	.99974	.99941	.99989	.99976	.99998	.99995	8
56	14	9.99925	0.99827	9.99953	0.99892	9.99975	0.99942	9.99990	0.99976	9.99998	0.99996	4
		$12^h 19^m$		$12^h 15^m$		$12^h 11^m$		$12^h 7^m$		$12^h 3^m$		
s	′	$11^h 41^m$	175°	$11^h 45^m$	176°	$11^h 49^m$	177	$11^h 53^m$	178°	$11^h 57^m$	179°	s
0	15	9.99925	0.99828	9.99953	0.99893	9.99975	0.99942	9.99990	0.99977	9.99998	0.99996	60
4	16	.99926	.99829	.99954	.99894	.99975	.99943	.99990	.99977	.99998	.99996	56
8	17	.99926	.99831	.99954	.99895	.99976	.99944	.99990	.99978	.99998	.99996	52
12	18	.99927	.99832	.99954	.99896	.99976	.99944	.99990	.99978	.99998	.99996	48
16	19	9.99927	0.99833	9.99955	0.99897	9.99976	0.99945	9.99991	0.99978	9.99998	0.99996	44
20	20	.99928	.99834	.99955	.99898	.99976	.99946	.99991	.99979	.99999	.99997	40
24	21	.99928	.99835	.99956	.99899	.99977	.99947	.99991	.99979	.99999	.99997	36
28	22	.99929	.99837	.99956	.99900	.99977	.99947	.99991	.99980	.99999	.99997	32
32	23	9.99929	0.99838	9.99957	0.99900	9.99977	0.99948	9.99991	0.99980	9.99999	0.99997	28
36	24	.99930	.99839	.99957	.99901	.99978	.99949	.99992	.99981	.99999	.99997	24
40	25	.99931	.99840	.99958	.99902	.99978	.99949	.99992	.99981	.99999	.99997	20
44	26	.99931	.99841	.99958	.99903	.99978	.99950	.99992	.99981	.99999	.99998	16
48	27	9.99932	0.99842	9.99958	0.99904	9.99978	0.99950	9.99992	0.99982	9.99999	0.99998	12
52	28	.99932	.99844	.99959	.99905	.99979	.99951	.99992	.99982	.99999	.99998	8
56	29	9.99933	0.99845	9.99959	0.99906	9.99979	0.99952	9.99992	0.99982	9.99999	0.99998	4
		$12^h 18^m$		$12^h 14^m$		$12^h 10^m$		$12^h 6^m$		$12^h 2^m$		
s	′	$11^h 42^m$	175°	$11^h 46^m$	176°	$11^h 50^m$	177°	$11^h 54^m$	178°	$11^h 58^m$	179°	s
0	30	9.99933	0.99846	9.99959	0.99907	9.99979	0.99952	9.99993	0.99983	9.99999	0.99998	60
4	31	.99934	.99847	.99960	.99908	.99980	.99953	.99993	.99983	.99999	.99998	56
8	32	.99934	.99848	.99960	.99909	.99980	.99954	.99993	.99984	.99999	.99998	52
12	33	.99935	.99849	.99961	.99909	.99980	.99954	.99993	.99984	.99999	.99998	48
16	34	9.99935	0.99850	9.99961	0.99910	9.99980	0.99955	9.99993	0.99984	9.99999	0.99999	44
20	35	.99935	.99851	.99961	.99911	.99981	.99956	.99993	.99985	.99999	.99999	40
24	36	.99936	.99853	.99962	.99912	.99981	.99956	.99994	.99985	9.99999	.99999	36
28	37	.99936	.99854	.99962	.99913	.99981	.99957	.99994	.99985	0.00000	.99999	32
32	38	9.99937	0.99855	9.99963	0.99914	9.99981	0.99957	9.99994	0.99986	0.00000	0.99999	28
36	39	.99937	.99856	.99963	.99915	.99982	.99958	.99994	.99986	.00000	.99999	24
40	40	.99938	.99857	.99963	.99915	.99982	.99959	.99994	.99986	.00000	.99999	20
44	41	.99938	.99858	.99964	.99916	.99982	.99959	.99994	.99987	.00000	.99999	16
48	42	9.99939	0.99859	9.99964	0.99917	9.99983	0.99960	9.99994	0.99987	0.00000	0.99999	12
52	43	.99939	.99860	.99964	.99918	.99983	.99960	.99995	.99987	.00000	.99999	8
56	44	9.99940	0.99861	9.99965	0.99919	9.99983	0.99961	9.99995	0.99988	0.00000	0.99999	4
		$12^h 17^m$		$12^h 13^m$		$12^h 9^m$		$12^h 5^m$		$12^h 1^m$		
s	′	$11^h 43^m$	175°	$11^h 47^m$	176°	$11^h 51^m$	177°	$11^h 55^m$	178°	$11^h 59^m$	179°	s
0	45	9.99940	0.99863	9.99965	0.99920	9.99983	0.99961	9.99995	0.99988	0.00000	1.00000	60
4	46	.99941	.99864	.99965	.99920	.99983	.99962	.99995	.99988	.00000	.00000	56
8	47	.99941	.99865	.99966	.99921	.99984	.99963	.99995	.99989	.00000	.00000	52
12	48	.99942	.99866	.99966	.99922	.99984	.99963	.99995	.99989	.00000	.00000	48
16	49	9.99942	0.99867	9.99966	0.99923	9.99984	0.99964	9.99995	0.99989	0.00000	1.00000	44
20	50	.99943	.99868	.99967	.99924	.99984	.99964	.99996	.99990	.00000	.00000	40
24	51	.99943	.99869	.99967	.99924	.99985	.99905	.99996	.99999	.00000	.00000	36
28	52	.99943	.99870	.99968	.99925	.99985	.99965	.99996	.99990	.00000	.00000	32
32	53	9.99944	0.99871	9.99968	0.99926	9.99985	0.99966	9.99996	0.99991	0.00000	1.00000	28
36	54	.99944	.99872	.99968	.99927	.99985	.99966	.99996	.99991	.00000	.00000	24
40	55	.99945	.99873	.99969	.99928	.99986	.99967	.99996	.99991	.00000	.00000	20
44	56	.99945	.99874	.99969	.99928	.99986	.99967	.99996	.99991	.00000	.00000	16
48	57	9.99946	0.99875	9.99969	0.99929	9.99986	0.99968	9.99996	0.99992	0.00000	1.00000	12
52	58	.99946	.99876	.99970	.99930	.99986	.99969	.99996	.99992	.00000	.00000	8
56	59	.99947	.99877	.99970	.99931	.99987	.99969	.99997	.99992	.00000	.00000	4
60	60	9.99947	0.99878	9.99970	0.99931	9.99987	0.99970	9.99997	0.99992	0.00000	1.00000	0
		$12^h 16^m$		$12^h 12^m$		$12^h 8^m$		$12^h 4^m$		$12^h 0^m$		

TABLE 46.

Corrections* to be Applied to the Observed Altitude of a Star or of the Sun's Lower Limb, to Find the True Altitude.

Obs. Alt.	HEIGHT OF THE EYE.											
	8 Feet.		9 Feet.		10 Feet.		11 Feet.		12 Feet.		13 Feet.	
	⊙ Sun's Corr. (+)	* Star's Corr. (−)	⊙ Sun's Corr. (+)	* Star's Corr. (−)	⊙ Sun's Corr. (+)	* Star's Corr. (−)	⊙ Sun's Corr. (+)	* Star's Corr. (−)	⊙ Sun's Corr. (+)	* Star's Corr. (−)	⊙ Sun's Corr. (+)	* Star's Corr. (−)
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
6 30	5 29	10 40	5 19	10 50	5 09	11 00	5 00	11 09	4 51	11 18	4 43	11 26
40	5 39	10 30	5 29	10 40	5 19	10 50	5 10	10 59	5 01	11 08	4 53	11 16
50	5 49	10 20	5 39	10 30	5 29	10 40	5 20	10 49	5 11	10 58	5 03	11 06
7 00	5 59	10 10	5 49	10 20	5 39	10 30	5 30	10 39	5 21	10 48	5 13	10 56
10	6 08	10 01	5 58	10 11	5 48	10 21	5 39	10 30	5 30	10 39	5 22	10 47
20	6 17	9 52	6 07	10 02	5 57	10 12	5 48	10 21	5 39	10 30	5 31	10 38
7 30	6 26	9 43	6 16	9 53	6 06	10 03	5 57	10 12	5 48	10 21	5 40	10 29
40	6 34	9 35	6 24	9 45	6 14	9 55	6 05	10 04	5 56	10 13	5 48	10 21
50	6 42	9 27	6 32	9 37	6 22	9 47	6 13	9 56	6 04	10 05	5 56	10 13
8 00	6 50	9 19	6 40	9 29	6 30	9 39	6 21	9 48	6 12	9 57	6 04	10 05
10	6 57	9 12	6 47	9 22	6 37	9 32	6 28	9 41	6 19	9 50	6 11	9 58
20	7 04	9 05	6 54	9 15	6 44	9 25	6 35	9 34	6 26	9 43	6 18	9 51
8 30	7 11	8 58	7 01	9 08	6 51	9 18	6 42	9 27	6 33	9 36	6 25	9 44
40	7 18	8 51	7 08	9 01	6 58	9 11	6 49	9 20	6 40	9 29	6 32	9 37
50	7 24	8 45	7 14	8 55	7 04	9 05	6 55	9 14	6 46	9 23	6 38	9 31
9 00	7 30	8 39	7 20	8 49	7 10	8 59	7 01	9 08	6 52	9 17	6 44	9 25
20	7 42	8 27	7 32	8 37	7 22	8 47	7 13	8 56	7 04	9 05	6 56	9 13
40	7 53	8 16	7 43	8 26	7 33	8 36	7 24	8 45	7 15	8 54	7 07	9 02
10 00	8 04	8 05	7 54	8 15	7 44	8 25	7 35	8 34	7 26	8 43	7 18	8 51
20	8 14	7 55	8 04	8 05	7 54	8 15	7 45	8 24	7 36	8 33	7 28	8 41
40	8 23	7 46	8 13	7 56	8 03	8 06	7 54	8 15	7 45	8 24	7 37	8 32
11 00	8 32	7 37	8 22	7 47	8 12	7 57	8 03	8 06	7 54	8 15	7 46	8 23
30	8 44	7 25	8 34	7 35	8 24	7 45	8 15	7 54	8 06	8 03	7 58	8 11
12 00	8 55	7 14	8 45	7 24	8 35	7 34	8 26	7 43	8 17	7 52	8 09	8 00
30	9 06	7 03	8 56	7 13	8 46	7 23	8 37	7 32	8 28	7 41	8 20	7 49
13 00	9 16	6 53	9 06	7 03	8 56	7 13	8 47	7 22	8 38	7 31	8 30	7 39
30	9 25	6 44	9 15	6 54	9 05	7 04	8 56	7 13	8 47	7 22	8 39	7 30
14 00	9 33	6 36	9 23	6 46	9 13	6 56	9 04	7 05	8 55	7 14	8 47	7 22
15 00	9 49	6 20	9 39	6 30	9 29	6 40	9 20	6 49	9 11	6 58	9 03	7 06
16 00	10 02	6 07	9 52	6 17	9 42	6 27	9 33	6 36	9 24	6 45	9 16	6 53
17 00	10 15	5 54	10 05	6 04	9 55	6 14	9 46	6 23	9 37	6 32	9 29	6 40
18 00	10 25	5 44	10 15	5 54	10 05	6 04	9 56	6 13	9 47	6 22	9 39	6 30
19 00	10 35	5 34	10 25	5 44	10 15	5 54	10 06	6 03	9 57	6 12	9 49	6 20
20 00	10 43	5 25	10 33	5 35	10 23	5 45	10 14	5 54	10 05	6 03	9 57	6 11
22 00	10 59	5 09	10 49	5 19	10 39	5 29	10 30	5 38	10 21	5 47	10 13	5 55
24 00	11 12	4 56	11 02	5 06	10 52	5 16	10 43	5 25	10 34	5 34	10 26	5 42
26 00	11 23	4 45	11 13	4 55	11 03	5 05	10 54	5 14	10 45	5 23	10 37	5 31
28 00	11 33	4 35	11 23	4 45	11 13	4 55	11 04	5 04	10 55	5 13	10 47	5 21
30 00	11 41	4 27	11 31	4 37	11 21	4 47	11 12	4 56	11 03	5 05	10 55	5 13
32 00	11 49	4 19	11 39	4 29	11 29	4 39	11 20	4 48	11 11	4 57	11 03	5 05
34 00	11 56	4 12	11 46	4 22	11 36	4 32	11 27	4 41	11 18	4 50	11 10	4 58
36 00	12 02	4 06	11 52	4 16	11 42	4 26	11 33	4 35	11 24	4 44	11 16	4 52
38 00	12 07	4 01	11 57	4 11	11 47	4 21	11 38	4 30	11 29	4 39	11 21	4 47
40 00	12 12	3 55	12 02	4 05	11 52	4 15	11 43	4 24	11 34	4 33	11 26	4 41
45 00	12 23	3 44	12 13	3 54	12 03	4 04	11 54	4 13	11 45	4 22	11 37	4 30
50 00	12 31	3 35	12 21	3 45	12 11	3 55	12 02	4 04	11 53	4 13	11 45	4 21
55 00	12 38	3 27	12 28	3 37	12 18	3 47	12 09	3 56	12 00	4 05	11 52	4 13
60 00	12 44	3 20	12 34	3 30	12 24	3 40	12 15	3 49	12 06	3 58	11 58	4 06
65 00	12 51	3 13	12 41	3 23	12 31	3 33	12 22	3 42	12 13	3 51	12 05	3 59
70 00	12 56	3 07	12 46	3 17	12 36	3 27	12 27	3 36	12 18	3 45	12 10	3 53
75 00	13 00	3 02	12 50	3 12	12 40	3 22	12 31	3 31	12 22	3 40	12 14	3 48
80 00	13 06	2 56	12 56	3 06	12 46	3 16	12 37	3 25	12 28	3 34	12 20	3 42
85 00	13 10	2 51	13 00	3 01	12 50	3 11	12 41	3 20	12 32	3 29	12 24	3 37
90 00	13 14	2 46	13 04	2 56	12 54	3 06	12 45	3 15	12 36	3 24	12 28	3 32

	Day of Month.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.
ADDITIONAL CORR. FOR SUN'S ALT.		″	″	″	″	″	″	″	″	″	″	″	″
	1st to 15th....	+18	+15	+8	0	− 8	−13	−14	−11	−5	+3	+11	+16
	16th to 31st...	+17	+12	+4	−4	−11	−14	−13	− 9	−1	+7	+14	+18

* The corrections for the observed altitude of a Star or Planet involves the dip and the refraction; and for the observed altitude of the Sun's lower limb, the dip, refraction, parallax, and mean semidiameter, which is taken as 16′. A supplementary correction taking account of the variation of the Sun's semidiameter in the different months of the year is given at the foot of the main table.

TABLE 46.

Corrections to be Applied to the Observed Altitude of a Star or of the Sun's Lower Limb, to Find the True Altitude—Continued.

Obs. Alt.	HEIGHT OF THE EYE.											
	14 Feet.		15 Feet.		16 Feet.		17 Feet.		18 Feet.		19 Feet.	
	☉ Sun's Corr. (+)	* Star's Corr. (−)	☉ Sun's Corr. (+)	* Star's Corr. (−)	☉ Sun's Corr. (+)	* Star's Corr. (−)	☉ Sun's Corr. (+)	* Star's Corr. (−)	☉ Sun's Corr. (+)	* Star's Corr. (−)	☉ Sun's Corr. (+)	* Star's Corr. (−)
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
6 30	4 35	11 34	4 27	11 42	4 20	11 49	4 13	11 56	4 06	12 03	3 59	12 10
40	4 45	11 24	4 37	11 32	4 30	11 39	4 23	11 46	4 16	11 53	4 09	12 00
50	4 55	11 14	4 47	11 22	4 40	11 29	4 33	11 36	4 26	11 43	4 19	11 50
7 00	5 05	11 04	4 57	11 12	4 50	11 19	4 43	11 26	4 36	11 33	4 29	11 40
10	5 14	10 55	5 06	11 03	4 59	11 10	4 52	11 17	4 45	11 24	4 38	11 31
20	5 23	10 46	5 15	10 54	5 08	11 01	5 01	11 08	4 54	11 15	4 47	11 22
7 30	5 32	10 37	5 24	10 45	5 17	10 52	5 10	10 59	5 03	11 06	4 56	11 13
40	5 40	10 29	5 32	10 37	5 25	10 44	5 18	10 51	5 11	10 58	5 04	11 05
50	5 48	10 21	5 40	10 29	5 33	10 36	5 26	10 43	5 19	10 50	5 12	10 57
8 00	5 56	10 13	5 48	10 21	5 41	10 28	5 34	10 35	5 27	10 42	5 20	10 49
10	6 03	10 06	5 55	10 14	5 48	10 21	5 41	10 28	5 34	10 35	5 27	10 42
20	6 10	9 59	6 02	10 07	5 55	10 14	5 48	10 21	5 41	10 28	5 34	10 35
8 30	6 17	9 52	6 09	10 00	6 02	10 07	5 55	10 14	5 48	10 21	5 41	10 28
40	6 24	9 45	6 16	9 53	6 09	10 00	6 02	10 07	5 55	10 14	5 48	10 21
50	6 30	9 39	6 22	9 47	6 15	9 54	6 08	10 01	6 01	10 08	5 54	10 15
9 00	6 36	9 33	6 28	9 41	6 21	9 48	6 14	9 55	6 07	10 02	6 00	10 09
20	6 48	9 21	6 40	9 29	6 33	9 36	6 26	9 43	6 19	9 50	6 12	9 57
40	6 59	9 10	6 51	9 18	6 44	9 25	6 37	9 32	6 30	9 39	6 23	9 46
10 00	7 10	8 59	7 02	9 07	6 55	9 14	6 48	9 21	6 41	9 28	6 34	9 35
20	7 20	8 49	7 12	8 57	7 05	9 04	6 58	9 11	6 51	9 18	6 44	9 25
40	7 29	8 40	7 21	8 48	7 14	8 55	7 07	9 02	7 00	9 09	6 53	9 16
11 00	7 38	8 31	7 30	8 39	7 23	8 46	7 16	8 53	7 09	9 00	7 02	9 07
30	7 50	8 19	7 42	8 27	7 35	8 34	7 28	8 41	7 21	8 48	7 14	8 55
12 00	8 01	8 08	7 53	8 16	7 46	8 23	7 39	8 30	7 32	8 37	7 25	8 44
30	8 12	7 57	8 04	8 05	7 57	8 12	7 50	8 19	7 43	8 26	7 36	8 33
13 00	8 22	7 47	8 14	7 55	8 07	8 02	8 00	8 09	7 53	8 16	7 46	8 23
30	8 31	7 38	8 23	7 46	8 16	7 53	8 09	8 00	8 02	8 07	7 55	8 14
14 00	8 39	7 30	8 31	7 38	8 24	7 45	8 17	7 52	8 10	7 59	8 03	8 06
15 00	8 55	7 14	8 47	7 22	8 40	7 29	8 33	7 36	8 26	7 43	8 19	7 50
16 00	9 08	7 01	9 00	7 09	8 53	7 16	8 46	7 23	8 39	7 30	8 32	7 37
17 00	9 21	6 48	9 13	6 56	9 06	7 03	8 59	7 10	8 52	7 17	8 45	7 24
18 00	9 31	6 38	9 23	6 46	9 16	6 53	9 09	7 00	9 02	7 07	8 55	7 14
19 00	9 41	6 28	9 33	6 36	9 26	6 43	9 19	6 50	9 12	6 57	9 05	7 04
20 00	9 49	6 19	9 41	6 27	9 34	6 34	9 27	6 41	9 20	6 48	9 13	6 55
22 00	10 05	6 03	9 57	6 11	9 50	6 18	9 43	6 25	9 36	6 32	9 29	6 39
24 00	10 18	5 50	10 10	5 58	10 03	6 05	9 56	6 12	9 49	6 19	9 42	6 26
26 00	10 29	5 39	10 21	5 47	10 14	5 54	10 07	6 01	10 00	6 08	9 53	6 15
28 00	10 39	5 29	10 31	5 37	10 24	5 44	10 17	5 51	10 10	5 58	10 03	6 05
30 00	10 47	5 21	10 39	5 29	10 32	5 36	10 25	5 43	10 18	5 50	10 11	5 57
32 00	10 55	5 13	10 47	5 21	10 40	5 28	10 33	5 35	10 26	5 42	10 19	5 49
34 00	11 02	5 06	10 54	5 14	10 47	5 21	10 40	5 28	10 33	5 35	10 26	5 42
36 00	11 08	5 00	11 00	5 08	10 53	5 15	10 46	5 22	10 39	5 29	10 32	5 36
38 00	11 13	4 55	11 05	5 03	10 58	5 10	10 51	5 17	10 44	5 24	10 37	5 31
40 00	11 18	4 49	11 10	4 57	11 03	5 04	10 56	5 11	10 49	5 18	10 42	5 25
45 00	11 29	4 38	11 21	4 46	11 14	4 53	11 07	5 00	11 00	5 07	10 53	5 14
50 00	11 37	4 29	11 29	4 37	11 22	4 44	11 15	4 51	11 08	4 58	11 01	5 05
55 00	11 44	4 21	11 36	4 29	11 29	4 36	11 22	4 43	11 15	4 50	11 08	4 57
60 00	11 50	4 14	11 42	4 22	11 35	4 29	11 28	4 36	11 21	4 43	11 14	4 50
65 00	11 57	4 07	11 49	4 15	11 42	4 22	11 35	4 29	11 28	4 36	11 21	4 43
70 00	12 02	4 01	11 54	4 09	11 47	4 16	11 40	4 23	11 33	4 30	11 26	4 37
75 00	12 06	3 56	11 58	4 04	11 51	4 11	11 44	4 18	11 37	4 25	11 30	4 32
80 00	12 12	3 50	12 04	3 58	11 57	4 05	11 50	4 12	11 43	4 19	11 36	4 26
85 00	12 16	3 45	12 08	3 53	12 01	4 00	11 54	4 07	11 47	4 14	11 40	4 21
90 00	12 20	3 40	12 12	3 48	12 05	3 55	11 58	4 02	11 51	4 09	11 44	4 16

	Day of Month.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Additional Corr. for Sun's Alt.		″	″	″	″	″	″	″	″	″	″	″	″
	1st to 15th....	+18	+15	+8	0	−8	−13	−14	−11	−5	+3	+11	+16
	16th to 31st...	+17	+12	+4	−4	−11	−14	−13	− 9	−1	+7	+14	+18

* The corrections for the observed altitude of a Star or Planet involves the dip and the refraction; and for the observed altitude of the Sun's lower limb, the dip, refraction, parallax, and mean semidiameter, which is taken as 16′. A supplementary correction taking account of the variation of the Sun's semidiameter in the different months of the year is given at the foot of the main table.

TABLE 46.

Corrections to be Applied to the Observed Altitude of a Star or of the Sun's Lower Limb, to Find the True Altitude—Continued.

Obs. Alt.	HEIGHT OF THE EYE.											
	20 Feet.		21 Feet.		22 Feet.		23 Feet.		24 Feet.		25 Feet.	
	⊙ Sun's Corr. (+)	* Star's Corr. (−)	⊙ Sun's Corr. (+)	* Star's Corr. (−)	⊙ Sun's Corr. (+)	* Star's Corr. (−)	⊙ Sun's Corr. (+)	* Star's Corr. (−)	⊙ Sun's Corr. (+)	* Star's Corr. (−)	⊙ Sun's Corr. (+)	* Star's Corr. (−)
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
6 30	3 52	12 17	3 46	12 23	3 39	12 30	3 33	12 36	3 27	12 42	3 21	12 48
40	4 .2	12 07	3 56	12 13	3 49	12 20	3 43	12 26	3 37	12 32	3 31	12 38
50	4 12	11 57	4 06	12 03	3 59	12 10	3 53	12 16	3 47	12 22	3 41	12 28
7 00	4 22	11 47	4 16	11 53	4 09	12 00	4 03	12 06	3 57	12 12	3 51	12 18
10	4 31	11 38	4 25	11 44	4 18	11 51	4 12	11 57	4 06	12 03	4 00	12 09
20	4 40	11 29	4 34	11 35	4 27	11 42	4 21	11 48	4 15	11 54	4 09	12 00
7 30	4 49	11 20	4 43	11 26	4 36	11 33	4 30	11 39	4 24	11 45	4 18	11 51
40	4 57	11 12	4 51	11 18	4 44	11 25	4 38	11 31	4 32	11 37	4 26	11 43
50	5 05	11 04	4 59	11 10	4 52	11 17	4 46	11 23	4 40	11 29	4 34	11 35
8 00	5 13	10 56	5 07	11 02	5 00	11 09	4 54	11 15	4 48	11 21	4 42	11 27
10	5 20	10 49	5 14	10 55	5 07	11 02	5 01	11 08	4 55	11 14	4 49	11 20
20	5 27	10 42	5 21	10 48	5 14	10 55	5 08	11 01	5 02	11 07	4 56	11 13
8 30	5 34	10 35	5 28	10 41	5 21	10 48	5 15	10 54	5 09	11 00	5 03	11 06
40	5 41	10 28	5 35	10 34	5 28	10 41	5 22	10 47	5 16	10 53	5 10	10 59
50	5 47	10 22	5 41	10 28	5 34	10 35	5 28	10 41	5 22	10 47	5 16	10 53
9 00	5 53	10 16	5 47	10 22	5 40	10 29	5 34	10 35	5 28	10 41	5 22	10 47
20	6 05	10 04	5 59	10 10	5 52	10 17	5 46	10 23	5 40	10 29	5 34	10 35
40	6 16	9 53	6 10	9 59	6 03	10 06	5 57	10 12	5 51	10 18	5 45	10 24
10 00	6 27	9 42	6 21	9 48	6 14	9 55	6 08	10 01	6 02	10 07	5 56	10 13
20	6 37	9 32	6 31	9 38	6 24	9 45	6 18	9 51	6 12	9 57	6 06	10 03
40	6 46	9 23	6 40	9 29	6 33	9 36	6 27	9 42	6 21	9 48	6 15	9 54
11 00	6 55	9 14	6 49	9 20	6 42	9 27	6 36	9 33	6 30	9 39	6 24	9 45
30	7 07	9 02	7 01	9 08	6 54	9 15	6 48	9 21	6 42	9 27	6 36	9 33
12 00	7 18	8 51	7 12	8 57	7 05	9 04	6 59	9 10	6 53	9 16	6 47	9 22
30	7 29	8 40	7 23	8 46	7 16	8 53	7 10	8 59	7 04	9 05	6 58	9 11
13 00	7 39	8 30	7 33	8 36	7 26	8 43	7 20	8 49	7 14	8 55	7 08	9 01
30	7 48	8 21	7 42	8 27	7 35	8 34	7 29	8 40	7 23	8 46	7 17	8 52
14 00	7 56	8 13	7 50	8 19	7 43	8 26	7 37	8 32	7 31	8 38	7 25	8 44
15 00	8 12	7 57	8 06	8 03	7 59	8 10	7 53	8 16	7 47	8 22	7 41	8 28
16 00	8 25	7 44	8 19	7 50	8 12	7 57	8 06	8 03	8 00	8 09	7 54	8 15
17 00	8 38	7 31	8 32	7 37	8 25	7 44	8 19	7 50	8 13	7 56	8 07	8 02
18 00	8 48	7 21	8 42	7 27	8 35	7 34	8 29	7 40	8 23	7 46	8 17	7 52
19 00	8 58	7 11	8 52	7 17	8 45	7 24	8 39	7 30	8 33	7 36	8 27	7 42
20 00	9 06	7 02	9 00	7 08	8 53	7 15	8 47	7 21	8 41	7 27	8 35	7 33
22 00	9 22	6 46	9 16	6 52	9 09	6 59	9 03	7 05	8 57	7 11	8 51	7 17
24 00	9 35	6 33	9 29	6 39	9 22	6 46	9 16	6 52	9 10	6 58	9 04	7 04
26 00	9 46	6 22	9 40	6 28	9 33	6 35	9 27	6 41	9 21	6 47	9 15	6 53
28 00	9 56	6 12	9 50	6 18	9 43	6 25	9 37	6 31	9 31	6 37	9 25	6 43
30 00	10 04	6 04	9 58	6 10	9 51	6 17	9 45	6 23	9 39	6 29	9 33	6 35
32 00	10 12	5 56	10 06	6 02	9 59	6 09	9 53	6 15	9 47	6 21	9 41	6 27
34 00	10 19	5 49	10 13	5 55	10 06	6 02	10 00	6 08	9 54	6 14	9 48	6 20
36 00	10 25	5 43	10 19	5 49	10 12	5 56	10 06	6 02	10 00	6 08	9 54	6 14
38 00	10 30	5 38	10 24	5 44	10 17	5 51	10 11	5 57	10 05	6 03	9 59	6 09
40 00	10 35	5 32	10 29	5 38	10 22	5 45	10 16	5 51	10 10	5 57	10 04	6 03
45 00	10 46	5 21	10 40	5 27	10 33	5 34	10 27	5 40	10 21	5 46	10 15	5 52
50 00	10 54	5 12	10 48	5 18	10 41	5 25	10 35	5 31	10 29	5 37	10 23	5 43
55 00	11 01	5 04	10 55	5 10	10 48	5 17	10 42	5 23	10 36	5 29	10 30	5 35
60 00	11 07	4 57	11 01	5 03	10 54	5 10	10 48	5 16	10 42	5 22	10 36	5 28
65 00	11 14	4 50	11 08	4 56	11 01	5 03	10 55	5 09	10 49	5 15	10 43	5 21
70 00	11 19	4 44	11 13	4 50	11 06	4 57	11 00	5 03	10 54	5 09	10 48	5 15
75 00	11 23	4 39	11 17	4 45	11 10	4 52	11 04	4 58	10 58	5 04	10 52	5 10
80 00	11 29	4 33	11 23	4 39	11 16	4 46	11 10	4 52	11 04	4 58	10 58	5 04
85 00	11 33	4 28	11 27	4 34	11 20	4 41	11 14	4 47	11 08	4 53	11 02	4 59
90 00	11 37	4 23	11 31	4 29	11 24	4 36	11 18	4 42	11 12	4 48	11 06	4 54

	Day of Month.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Additional Corr. for Sun's Alt.		″	″	″	″	″	″	″	″	″	″	″	″
	1st to 15th....	+18	+15	+8	0	−8	−13	−14	−11	−5	+3	+11	+16
	16th to 31st...	+17	+12	+4	−4	−11	−14	−13	− 9	−1	+7	+14	+18

* The corrections for the observed altitude of a Star or Planet involves the dip and the refraction; and for the observed altitude of the Sun's lower limb, the dip, refraction, parallax, and mean semidiameter, which is taken as 16′. A supplementary correction taking account of the variation of the Sun's semidiameter in the different months of the year is given at the foot of the main table.

TABLE 46.

Corrections* to be Applied to the Observed Altitude of a Star or of the Sun's Lower Limb, to Find the True Altitude—Continued.

Obs. Alt.	HEIGHT OF THE EYE.									
	26 Feet.		27 Feet.		28 Feet.		29 Feet.		30 Feet.	
	☉ Sun's Corr. (+)	* Star's Corr. (−)	☉ Sun's Corr. (+)	* Star's Corr. (−)	☉ Sun's Corr. (+)	* Star's Corr. (−)	☉ Sun's Corr. (+)	* Star's Corr. (−)	☉ Sun's Corr. (+)	* Star's Corr. (−)
° ′	′ ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
6 30	3 15	12 54	3 09	13 00	3 04	13 05	2 58	13 11	2 53	13 16
40	3 25	12 44	3 19	12 50	3 14	12 55	3 08	13 01	3 03	13 06
50	3 35	12 34	3 29	12 40	3 24	12 45	3 18	12 51	3 13	12 56
7 00	3 45	12 24	3 39	12 30	3 34	12 35	3 28	12 41	3 23	12 46
10	3 54	12 15	3 48	12 21	3 43	12 26	3 37	12 32	3 32	12 37
20	4 03	12 06	3 57	12 12	3 52	12 17	3 46	12 23	3 41	12 28
7 30	4 12	11 57	4 06	12 03	4 01	12 08	3 55	12 14	3 50	12 19
40	4 20	11 49	4 14	11 55	4 09	12 00	4 03	12 06	3 58	12 11
50	4 28	11 41	4 22	11 47	4 17	11 52	4 11	11 58	4 06	12 03
8 00	4 36	11 33	4 30	11 39	4 25	11 44	4 19	11 50	4 14	11 55
10	4 43	11 26	4 37	11 32	4 32	11 37	4 26	11 43	4 21	11 48
20	4 50	11 19	4 44	11 25	4 39	11 30	4 33	11 36	4 28	11 41
8 30	4 57	11 12	4 51	11 18	4 46	11 23	4 40	11 29	4 35	11 34
40	5 04	11 05	4 58	11 11	4 53	11 16	4 47	11 22	4 42	11 27
50	5 10	10 59	5 04	11 05	4 59	11 10	4 53	11 16	4 48	11 21
9 00	5 16	10 53	5 10	10 59	5 05	11 04	4 59	11 10	4 54	11 15
20	5 28	10 41	5 22	10 47	5 17	10 52	5 11	10 58	5 06	11 03
40	5 39	10 30	5 33	10 36	5 28	10 41	5 22	10 47	5 17	10 52
10 00	5 50	10 19	5 44	10 25	5 39	10 30	5 33	10 36	5 28	10 41
20	6 00	10 09	5 54	10 15	5 49	10 20	5 43	10 26	5 38	10 31
40	6 09	10 00	6 03	10 06	5 58	10 11	5 52	10 17	5 47	10 22
11 00	6 18	9 51	6 12	9 57	6 07	10 02	6 01	10 08	5 56	10 13
30	6 30	9 39	6 24	9 45	6 19	9 50	6 13	9 56	6 08	10 01
12 00	6 41	9 28	6 35	9 34	6 30	9 39	6 24	9 45	6 19	9 50
30	6 52	9 17	6 46	9 23	6 41	9 28	6 35	9 34	6 30	9 39
13 00	7 02	9 07	6 56	9 13	6 51	9 18	6 45	9 24	6 40	9 29
30	7 11	8 58	7 05	9 04	7 00	9 09	6 54	9 15	6 49	9 20
14 00	7 19	8 50	7 13	8 56	7 08	9 01	7 02	9 07	6 57	9 12
15 00	7 35	8 34	7 29	8 40	7 24	8 45	7 18	8 51	7 13	8 56
16 00	7 48	8 21	7 42	8 27	7 37	8 32	7 31	8 38	7 26	8 43
17 00	8 01	8 08	7 55	8 14	7 50	8 19	7 44	8 25	7 39	8 30
18 00	8 11	7 58	8 05	8 04	8 00	8 09	7 54	8 15	7 49	8 20
19 00	8 21	7 48	8 15	7 54	8 10	7 59	8 04	8 05	7 59	8 10
20 00	8 29	7 39	8 23	7 45	8 18	7 50	8 12	7 56	8 07	8 01
22 00	8 45	7 23	8 39	7 29	8 34	7 34	8 28	7 40	8 23	7 45
24 00	8 58	7 10	8 52	7 16	8 47	7 21	8 41	7 27	8 36	7 32
26 00	9 09	6 59	9 03	7 05	8 58	7 10	8 52	7 16	8 47	7 21
28 00	9 19	6 49	9 13	6 55	9 08	7 00	9 02	7 06	8 57	7 11
30 00	9 27	6 41	9 21	6 47	9 16	6 52	9 10	6 58	9 05	7 03
32 00	9 35	6 33	9 29	6 39	9 24	6 44	9 18	6 50	9 13	6 55
34 00	9 42	6 26	9 36	6 32	9 31	6 37	9 25	6 43	9 20	6 48
36 00	9 48	6 20	9 42	6 26	9 37	6 31	9 31	6 37	9 26	6 42
38 00	9 53	6 15	9 47	6 21	9 42	6 26	9 36	6 32	9 31	6 37
40 00	9 58	6 09	9 52	6 15	9 47	6 20	9 41	6 26	9 36	6 31
45 00	10 09	5 58	10 03	6 04	9 58	6 09	9 52	6 15	9 47	6 20
50 00	10 17	5 49	10 11	5 55	10 06	6 00	10 00	6 06	9 55	6 11
55 00	10 24	5 41	10 18	5 47	10 13	5 52	10 07	5 58	10 02	6 03
60 00	10 30	5 34	10 24	5 40	10 19	5 45	10 13	5 51	10 08	5 56
65 00	10 37	5 27	10 31	5 33	10 26	5 38	10 20	5 44	10 15	5 49
70 00	10 42	5 21	10 36	5 27	10 31	5 32	10 25	5 38	10 20	5 43
75 00	10 46	5 16	10 40	5 22	10 35	5 27	10 29	5 33	10 24	5 38
80 00	10 52	5 10	10 46	5 16	10 41	5 21	10 35	5 27	10 30	5 32
85 00	10 56	5 05	10 50	5 11	10 45	5 16	10 39	5 22	10 34	5 27
90 00	11 00	5 00	10 54	5 06	10 49	5 11	10 43	5 17	10 38	5 22

	Day of Month.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Additional Corr. for Sun's Alt.		″	″	″	″	″	″	″	″	″	″	″	″
	1st to 15th....	+18	+15	+8	0	− 8	−13	−14	−11	−5	+3	+11	+16
	16th to 31st...	+17	+12	+4	−4	−11	−14	−13	− 9	−1	+7	−14	+18

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* The corrections for the observed altitude of a Star or Planet involves the dip and the refraction; and for the observed altitude of the Sun's lower limb, the dip, refraction, parallax, and mean semidiameter, which is taken as 16′. A supplementary correction taking account of the variation of the Sun's semidiameter in the different months of the year is given at the foot of the main table.

TABLE 46.

Corrections to be Applied to the Observed Altitude of a Star or of the Sun's Lower Limb, to Find the True Altitude—Continued.

OBS. ALT.	HEIGHT OF THE EYE.									
	31 Feet.		32 Feet.		33 Feet.		34 Feet.		35 Feet.	
	⊙ Sun's Corr. (+)	* Star's Corr. (−)	⊙ Sun's Corr. (+)	* Star's Corr. (−)	⊙ Sun's Corr. (+)	* Star's Corr. (−)	⊙ Sun's Corr. (+)	* Star's Corr. (−)	⊙ Sun's Corr. (+)	* Star's Corr. (−)
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
6 30	2 48	13 21	2 42	13 27	2 37	13 32	2 32	13 37	2 27	13 42
40	2 58	13 11	2 52	13 17	2 47	13 22	2 42	13 27	2 37	13 32
50	3 08	13 01	3 02	13 07	2 57	13 12	2 52	13 17	2 47	13 22
7 00	3 18	12 51	3 12	12 57	3 07	13 02	3 02	13 07	2 57	13 12
10	3 27	12 42	3 21	12 48	3 16	12 53	3 11	12 58	3 06	13 03
20	3 36	12 33	3 30	12 39	3 25	12 44	3 20	12 49	3 15	12 54
7 30	3 45	12 24	3 39	12 30	3 34	12 35	3 29	12 40	3 24	12 45
40	3 53	12 16	3 47	12 22	3 42	12 27	3 37	12 32	3 32	12 37
50	4 01	12 08	3 55	12 14	3 50	12 19	3 45	12 24	3 40	12 29
8 00	4 09	12 00	4 03	12 06	3 58	12 11	3 53	12 16	3 48	12 21
10	4 16	11 53	4 10	11 59	4 05	12 04	4 00	12 09	3 55	12 14
20	4 23	11 46	4 17	11 52	4 12	11 57	4 07	12 02	4 02	12 07
8 30	4 30	11 39	4 24	11 45	4 19	11 50	4 14	11 55	4 09	12 00
40	4 37	11 32	4 31	11 38	4 26	11 43	4 21	11 48	4 16	11 53
50	4 43	11 26	4 37	11 32	4 32	11 37	4 27	11 42	4 22	11 47
9 00	4 49	11 20	4 43	11 26	4 38	11 31	4 33	11 36	4 28	11 41
20	5 01	11 08	4 55	11 14	4 50	11 19	4 45	11 24	4 40	11 29
40	5 12	10 57	5 06	11 03	5 01	11 08	4 56	11 13	4 51	11 18
10 00	5 23	10 46	5 17	10 52	5 12	10 57	5 07	11 02	5 02	11 07
20	5 33	10 36	5 27	10 42	5 22	10 47	5 17	10 52	5 12	10 57
40	5 42	10 27	5 36	10 33	5 31	10 38	5 26	10 43	5 21	10 48
11 00	5 51	10 18	5 45	10 24	5 40	10 29	5 35	10 34	5 30	10 39
30	6 03	10 06	5 57	10 12	5 52	10 17	5 47	10 22	5 42	10 27
12 00	6 14	9 55	6 08	10 01	6 03	10 06	5 58	10 11	5 53	10 16
30	6 25	9 44	6 19	9 50	6 14	9 55	6 09	10 00	6 04	10 05
13 00	6 35	9 34	6 29	9 40	6 24	9 45	6 19	9 50	6 14	9 55
30	6 44	9 25	6 38	9 31	6 33	9 36	6 28	9 41	6 23	9 46
14 00	6 52	9 17	6 46	9 23	6 41	9 28	6 36	9 33	6 31	9 38
15 00	7 08	9 01	7 02	9 07	6 57	9 12	6 52	9 17	6 47	9 22
16 00	7 21	8 48	7 15	8 54	7 10	8 59	7 05	9 04	7 00	9 09
17 00	7 34	8 35	7 28	8 41	7 23	8 46	7 18	8 51	7 13	8 56
18 00	7 44	8 25	7 38	8 31	7 33	8 36	7 28	8 41	7 23	8 46
19 00	7 54	8 15	7 48	8 21	7 43	8 26	7 38	8 31	7 33	8 36
20 00	8 02	8 06	7 56	8 12	7 51	8 17	7 46	8 22	7 41	8 27
22 00	8 18	7 50	8 12	7 56	8 07	8 01	8 02	8 06	7 57	8 11
24 00	8 31	7 37	8 25	7 43	8 20	7 48	8 15	7 53	8 10	7 58
26 00	8 42	7 26	8 36	7 32	8 31	7 37	8 26	7 42	8 21	7 47
28 00	8 52	7 16	8 46	7 22	8 41	7 27	8 36	7 32	8 31	7 37
30 00	9 00	7 08	8 54	7 14	8 49	7 19	8 44	7 24	8 39	7 29
32 00	9 08	7 00	9 02	7 06	8 57	7 11	8 52	7 16	8 47	7 21
34 00	9 15	6 53	9 09	6 59	9 04	7 04	8 59	7 09	8 54	7 14
36 00	9 21	6 47	9 15	6 53	9 10	6 58	9 05	7 03	9 00	7 08
38 00	9 26	6 42	9 20	6 48	9 15	6 53	9 10	6 58	9 05	7 03
40 00	9 31	6 36	9 25	6 42	9 20	6 47	9 15	6 52	9 10	6 57
45 00	9 42	6 25	9 36	6 31	9 31	6 36	9 26	6 41	9 21	6 46
50 00	9 50	6 16	9 44	6 22	9 39	6 27	9 34	6 32	9 29	6 37
55 00	9 57	6 08	9 51	6 14	9 46	6 19	9 41	6 24	9 36	6 29
60 00	10 03	6 01	9 57	6 07	9 52	6 12	9 47	6 17	9 42	6 22
65 00	10 10	5 54	10 04	6 00	9 59	6 05	9 54	6 10	9 49	6 15
70 00	10 15	5 48	10 09	5 54	10 04	5 59	9 59	6 04	9 54	6 09
75 00	10 19	5 43	10 13	5 49	10 08	5 54	10 03	5 59	9 58	6 04
80 00	10 25	5 37	10 19	5 43	10 14	5 48	10 09	5 53	10 04	5 58
85 00	10 29	5 32	10 23	5 38	10 18	5 43	10 13	5 48	10 08	5 53
90 00	10 33	5 27	10 27	5 33	10 22	5 38	10 17	5 43	10 12	5 48

	Day of Month.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
ADDITIONAL CORR. FOR SUN'S ALT.		″	″	″	″	″	″	″	″	″	″	″	″
	1st to 15th....	+18	+15	+8	0	− 8	−13	−14	−11	−5	+3	+11	+16
	16th to 31st...	+17	+12	+4	−4	−11	−14	−13	− 9	−1	+7	+14	+18

* The corrections for the observed altitude of a Star or Planet involves the dip and the refraction; and for the observed altitude of the Sun's lower limb, the dip, refraction, parallax, and mean semidiameter, which is taken as 16′. A supplementary correction taking account of the variation of the Sun's semidiameter in the different months of the year is given at the foot of the main table.

TABLE 46.

Corrections* to be Applied to the Observed Altitude of a Star or of the Sun's Lower Limb, to Find the True Altitude—Continued.

Obs. Alt.	HEIGHT OF THE EYE.									
	36 Feet.		37 Feet.		38 Feet.		39 Feet.		40 Feet.	
	⊙ Sun's Corr. (+)	* Star's Corr. (−)	⊙ Sun's Corr. (+)	* Star's Corr. (−)	⊙ Sun's Corr. (+)	* Star's Corr. (−)	⊙ Sun's Corr. (+)	* Star's Corr. (−)	⊙ Sun's Corr. (+)	* Star's Corr. (−)
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
6 30	2 22	13 47	2 17	13 52	2 13	13 56	2 08	14 01	2 03	14 06
40	2 32	13 37	2 27	13 42	2 23	13 46	2 18	13 51	2 13	13 56
50	2 42	13 27	2 37	13 32	2 33	13 36	2 28	13 41	2 23	13 46
7 00	2 52	13 17	2 47	13 22	2 43	13 26	2 38	13 31	2 33	13 36
10	3 01	13 08	2 56	13 13	2 52	13 17	2 47	13 22	2 42	13 27
20	3 10	12 59	3 05	13 04	3 01	13 08	2 56	13 13	2 51	13 18
7 30	3 19	12 50	3 14	12 55	3 10	12 59	3 05	13 04	3 00	13 09
40	3 27	12 42	3 22	12 47	3 18	12 51	3 13	12 56	3 08	13 01
50	3 35	12 34	3 30	12 39	3 26	12 43	3 21	12 48	3 16	12 53
8 00	3 43	12 26	3 38	12 31	3 34	12 35	3 29	12 40	3 24	12 45
10	3 50	12 19	3 45	12 24	3 41	12 28	3 36	12 33	3 31	12 38
20	3 57	12 12	3 52	12 17	3 48	12 21	3 43	12 26	3 38	12 31
8 30	4 04	12 05	3 59	12 10	3 55	12 14	3 50	12 19	3 45	12 24
40	4 11	11 58	4 06	12 03	4 02	12 07	3 57	12 12	3 52	12 17
50	4 17	11 52	4 12	11 57	4 08	12 01	4 03	12 06	3 58	12 11
9 00	4 23	11 46	4 18	11 51	4 14	11 55	4 09	12 00	4 04	12 05
20	4 35	11 34	4 30	11 39	4 26	11 43	4 21	11 48	4 16	11 53
40	4 46	11 23	4 41	11 28	4 37	11 32	4 32	11 37	4 27	11 42
10 00	4 57	11 12	4 52	11 17	4 48	11 21	4 43	11 26	4 38	11 31
20	5 07	11 02	5 02	11 07	4 58	11 11	4 53	11 16	4 48	11 21
40	5 16	10 53	5 11	10 58	5 07	11 02	5 02	11 07	4 57	11 12
11 00	5 25	10 44	5 20	10 49	5 16	10 53	5 11	10 58	5 06	11 03
30	5 37	10 32	5 32	10 37	5 28	10 41	5 23	10 46	5 18	10 51
12 00	5 48	10 21	5 43	10 26	5 39	10 30	5 34	10 35	5 29	10 40
30	5 59	10 10	5 54	10 15	5 50	10 19	5 45	10 24	5 40	10 29
13 00	6 09	10 00	6 04	10 05	6 00	10 09	5 55	10 14	5 50	10 19
30	6 18	9 51	6 13	9 56	6 09	10 00	6 04	10 05	5 59	10 10
14 00	6 26	9 43	6 21	9 48	6 17	9 52	6 12	9 57	6 07	10 02
15 00	6 42	9 27	6 37	9 32	6 33	9 36	6 28	9 41	6 23	9 46
16 00	6 55	9 14	6 50	9 19	6 46	9 23	6 41	9 28	6 36	9 33
17 00	7 08	9 01	7 03	9 06	6 59	9 10	6 54	9 15	6 49	9 20
18 00	7 18	8 51	7 13	8 56	7 09	9 00	7 04	9 05	6 59	9 10
19 00	7 28	8 41	7 23	8 46	7 19	8 50	7 14	8 55	7 09	9 00
20 00	7 36	8 32	7 31	8 37	7 27	8 41	7 22	8 46	7 17	8 51
22 00	7 52	8 16	7 47	8 21	7 43	8 25	7 38	8 30	7 33	8 35
24 00	8 05	8 03	8 00	8 08	7 56	8 12	7 51	8 17	7 46	8 22
26 00	8 16	7 52	8 11	7 57	8 07	8 01	8 02	8 06	7 57	8 11
28 00	8 26	7 42	8 21	7 47	8 17	7 51	8 12	7 56	8 07	8 01
30 00	8 34	7 34	8 29	7 39	8 25	7 43	8 20	7 48	8 15	7 53
32 00	8 42	7 26	8 37	7 31	8 33	7 35	8 28	7 40	8 23	7 45
34 00	8 49	7 19	8 44	7 24	8 40	7 28	8 35	7 33	8 30	7 38
36 00	8 55	7 13	8 50	7 18	8 46	7 22	8 41	7 27	8 36	7 32
38 00	9 00	7 08	8 55	7 13	8 51	7 17	8 46	7 22	8 41	7 27
40 00	9 05	7 02	9 00	7 07	8 56	7 11	8 51	7 16	8 46	7 21
45 00	9 16	6 51	9 11	6 56	9 07	7 00	9 02	7 05	8 57	7 10
50 00	9 24	6 42	9 19	6 47	9 15	6 51	9 10	6 56	9 05	7 01
55 00	9 31	6 34	9 26	6 39	9 22	6 43	9 17	6 48	9 12	6 53
60 00	9 37	6 27	9 32	6 32	9 28	6 36	9 23	6 41	9 18	6 46
65 00	9 44	6 20	9 39	6 25	9 35	6 29	9 30	6 34	9 25	6 39
70 00	9 49	6 14	9 44	6 19	9 40	6 23	9 35	6 28	9 30	6 33
75 00	9 53	6 09	9 48	6 14	9 44	6 18	9 39	6 23	9 34	6 28
80 00	9 59	6 03	9 54	6 08	9 50	6 12	9 45	6 17	9 40	6 22
85 00	10 03	5 58	9 58	6 03	9 54	6 07	9 49	6 12	9 44	6 17
90 00	10 07	5 53	10 02	5 58	9 58	6 02	9 53	6 07	9 48	6 12

Additional Corr. for Sun's Alt.	Day of Month.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
		″	″	″	″	″	″	″	″	″	″	″	″
	1st to 15th....	+18	+15	+8	0	− 8	−13	−14	−11	−5	+3	+11	+16
	16th to 31st...	+17	+12	+4	−4	−11	−14	−13	− 9	−1	+7	+14	+18

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* The corrections for the observed altitude of a Star or Planet involves the dip and the refraction; and for the observed altitude of the Sun's lower limb, the dip, refraction, parallax, and mean semidiameter, which is taken as 16′. A supplementary correction taking account of the variation of the Sun's semidiameter in the different months of the year is given at the foot of the main table.

TABLE 47.

Longitude Factors.

F is the Correction (in Minutes) to Long., due to each Mile of Error in Lat.

Latitude.

Az.	0°	17°.3	24°.4	29°.4	33°.7	37°.4	40°.7	43°.6	46°.2	48°.6	50°.9	52°.9	54°.9	56°.7	Az.
1°.0	57	60	63	66	69	72	76	79	83	87	91	95	100	105	**1°.0**
2.0	29	30	32	33	35	36	38	40	42	44	46	48	50	52	**2.0**
3.0	19	20	21	22	23	24	25	26	28	29	30	32	33	35	**3.0**
4.0	14	15	16	17	17	18	19	20	21	22	23	24	25	26	**4.0**
5.0	11	12	13	13	14	14	15	16	17	17	18	19	20	21	**5.0**
6.0	9.5	10	10	11	11	12	13	13	14	14	15	16	17	17	**6.0**
7.0	8.1	8.7	9.1	9.5	10	10	11	11	12	13	13	14	14	15	**7.0**
8.0	7.1	7.6	7.9	8.3	8.7	9.1	9.5	10	10	11	11	12	13	13	**8.0**
9.0	6.3	6.6	6.9	7.2	7.6	7.9	8.3	8.7	9.1	9.6	10.0	10.0	11.0	11.0	**9.0**
9.4	6.03	6.31	6.61	6.92	7.24	7.59	7.95	8.32	8.71	9.12	9.55	10.0	10.5	11.0	**9.4**
9.9	5.75	6.03	6.31	6.61	6.92	7.24	7.59	7.95	8.32	8.71	9.12	9.55	10.0	10.5	**9.9**
10.3	5.50	5.75	6.03	6.31	6.61	6.92	7.24	7.59	7.95	8.32	8.71	9.12	9.55	10.0	**10.3**
10.8	5.25	5.50	5.75	6.03	6.31	6.61	6.92	7.24	7.59	7.95	8.32	8.71	9.12	9.55	**10.8**
11.3	5.01	5.25	5.50	5.75	6.03	6.31	6.61	6.92	7.24	7.59	7.95	8.32	8.71	9.12	**11.3**
11.8	4.79	5.01	5.25	5.50	5.75	6.03	6.31	6.61	6.92	7.24	7.59	7.95	8.32	8.71	**11.8**
12.3	4.57	4.79	5.01	5.25	5.50	5.75	6.03	6.31	6.61	6.92	7.24	7.59	7.95	8.32	**12.3**
12.9	4.37	4.57	4.79	5.01	5.25	5.50	5.75	6.03	6.31	6.61	6.92	7.24	7.59	7.95	**12.9**
13.5	4.17	4.37	4.57	4.79	5.01	5.25	5.50	5.75	6.03	6.31	6.61	6.92	7.24	7.59	**13.5**
14.1	3.98	4.17	4.37	4.57	4.79	5.01	5.25	5.50	5.75	6.03	6.31	6.61	6.92	7.24	**14.1**
14.7	3.80	3.98	4.17	4.37	4.57	4.79	5.01	5.25	5.50	5.75	6.03	6.31	6.61	6.92	**14.7**
15.4	3.63	3.80	3.98	4.17	4.37	4.57	4.79	5.01	5.25	5.50	5.75	6.03	6.31	6.61	**15.4**
16.1	3.47	3.63	3.80	3.98	4.17	4.37	4.57	4.79	5.01	5.25	5.50	5.75	6.03	6.31	**16.1**
16.8	3.31	3.47	3.63	3.80	3.98	4.17	4.37	4.57	4.79	5.01	5.25	5.50	5.75	6.03	**16.8**
17.5	3.16	3.31	3.47	3.63	3.80	3.98	4.17	4.37	4.57	4.79	5.01	5.25	5.50	5.75	**17.5**
18.3	3.02	3.16	3.31	3.47	3.63	3.80	3.98	4.17	4.37	4.57	4.79	5.01	5.25	5.50	**18.3**
19.1	2.88	3.02	3.16	3.31	3.47	3.63	3.80	3.98	4.17	4.37	4.57	4.79	5.01	5.25	**19.1**
20.0	2.75	2.88	3.02	3.16	3.31	3.47	3.63	3.80	3.98	4.17	4.37	4.57	4.79	5.01	**20.0**
20.8	2.63	2.75	2.88	3.02	3.16	3.31	3.47	3.63	3.80	3.98	4.17	4.37	4.57	4.79	**20.8**
21.7	2.51	2.63	2.75	2.88	3.02	3.16	3.31	3.47	3.63	3.80	3.98	4.17	4.37	4.57	**21.7**
22.6	2.40	2.51	2.63	2.75	2.88	3.02	3.16	3.31	3.47	3.63	3.80	3.98	4.17	4.37	**22.6**
23.6	2.29	2.40	2.51	2.63	2.75	2.88	3.02	3.16	3.31	3.47	3.63	3.80	3.98	4.17	**23.6**
24.6	2.19	2.29	2.40	2.51	2.63	2.75	2.88	3.02	3.16	3.31	3.47	3.63	3.80	3.98	**24.6**
25.6	2.09	2.19	2.29	2.40	2.51	2.63	2.75	2.88	3.02	3.16	3.31	3.47	3.63	3.80	**25.6**
26.6	2.00	2.09	2.19	2.29	2.40	2.51	2.63	2.75	2.88	3.02	3.16	3.31	3.47	3.63	**26.6**
27.7	1.91	2.00	2.09	2.19	2.29	2.40	2.51	2.63	2.75	2.88	3.02	3.16	3.31	3.47	**27.7**
28.8	1.82	1.91	2.00	2.09	2.19	2.29	2.40	2.51	2.63	2.75	2.88	3.02	3.16	3.31	**28.8**
29.9	1.74	1.82	1.91	2.00	2.09	2.19	2.29	2.40	2.51	2.63	2.75	2.88	3.02	3.16	**29.9**
31.1	1.66	1.74	1.82	1.91	2.00	2.09	2.19	2.29	2.40	2.51	2.63	2.75	2.88	3.02	**31.1**
32.2	1.58	1.66	1.74	1.82	1.91	2.00	2.09	2.19	2.29	2.40	2.51	2.63	2.75	2.88	**32.2**
33.5	1.51	1.58	1.66	1.74	1.82	1.91	2.00	2.09	2.19	2.29	2.40	2.51	2.63	2.75	**33.5**
34.7	1.45	1.51	1.58	1.66	1.74	1.82	1.91	2.00	2.09	2.19	2.29	2.40	2.51	2.63	**34.7**
35.9	1.38	1.45	1.51	1.58	1.66	1.74	1.82	1.91	2.00	2.09	2.19	2.29	2.40	2.51	**35.9**
37.2	1.32	1.38	1.45	1.51	1.58	1.66	1.74	1.82	1.91	2.00	2.09	2.19	2.29	2.40	**37.2**
38.5	1.26	1.32	1.38	1.45	1.51	1.58	1.66	1.74	1.82	1.91	2.00	2.09	2.19	2.29	**38.5**
39.8	1.20	1.26	1.32	1.38	1.45	1.51	1.58	1.66	1.74	1.82	1.91	2.00	2.09	2.19	**39.8**
41.1	1.15	1.20	1.26	1.32	1.38	1.45	1.51	1.58	1.66	1.74	1.82	1.91	2.00	2.09	**41.1**
42.4	1.10	1.15	1.20	1.26	1.32	1.38	1.45	1.51	1.58	1.66	1.74	1.82	1.91	2.00	**42.4**
43.7	1.05	1.10	1.15	1.20	1.26	1.32	1.38	1.45	1.51	1.58	1.66	1.74	1.82	1.91	**43.7**
45.0	1.00	1.05	1.10	1.15	1.20	1.26	1.32	1.38	1.45	1.51	1.58	1.66	1.74	1.82	**45.0**
	0°	**17°.3**	**24°.4**	**29°.4**	**33°.7**	**37°.4**	**40°.7**	**43°.6**	**46°.2**	**48°.6**	**50°.9**	**52°.9**	**54°.9**	**56°.7**	

Corr. to Long.=Error in Lat.×**F**.

TABLE 47.

Longitude Factors.

F is the Correction (in Minutes) to Long., due to each Mile of Error in Lat.

Latitude.

Az.	0°	17°.3	24°.4	29°.4	33°.7	37°.4	40°.7	43°.6	46°.2	48°.6	50°.9	52°.9	54°.9	56°.7	Az.
45°.0	1.00	1.05	1.10	1.15	1.20	1.26	1.32	1.38	1.45	1.51	1.58	1.66	1.74	1.82	**45°.0**
46.3	.95	1.00	1.05	1.10	1.15	1.20	1.26	1.32	1.38	1.45	1.51	1.58	1.66	1.74	**46.3**
47.6	.91	.95	1.00	1.05	1.10	1.15	1.20	1.26	1.32	1.38	1.45	1.51	1.58	1.66	**47.6**
48.9	.87	.91	.95	1.00	1.05	1.10	1.15	1.20	1.26	1.32	1.38	1.45	1.51	1.58	**48.9**
50.2	.83	.87	.91	.95	1.00	1.05	1.10	1.15	1.20	1.26	1.32	1.38	1.45	1.51	**50.2**
51.5	.79	.83	.87	.91	.95	1.00	1.05	1.10	1.15	1.20	1.26	1.32	1.38	1.45	**51.5**
52.8	.76	.79	.83	.87	.91	.95	1.00	1.05	1.10	1.15	1.20	1.26	1.32	1.38	**52.8**
54.1	.72	.76	.79	.83	.87	.91	.95	1.00	1.05	1.10	1.15	1.20	1.26	1.32	**54.1**
55.3	.69	.72	.76	.79	.83	.87	.91	.95	1.00	1.05	1.10	1.15	1.20	1.26	**55.3**
56.5	.66	.69	.72	.76	.79	.83	.87	.91	.95	1.00	1.05	1.10	1.15	1.20	**56.5**
57.7	.63	.66	.69	.72	.76	.79	.83	.87	.91	.95	1.00	1.05	1.10	1.15	**57.7**
58.9	.60	.63	.66	.69	.72	.76	.79	.83	.87	.91	.95	1.00	1.05	1.10	**58.9**
60.1	.58	.60	.63	.66	.69	.72	.76	.79	.83	.87	.91	.95	1.00	1.05	**60.1**
61.2	.55	.58	.60	.63	.66	.69	.72	.76	.79	.83	.87	.91	.95	1.00	**61.2**
62.3	.52	.55	.58	.60	.63	.66	.69	.72	.76	.79	.83	.87	.91	.95	**62.3**
63.4	.50	.52	.55	.58	.60	.63	.66	.69	.72	.76	.79	.83	.87	.91	**63.4**
64.4	.48	.50	.52	.55	.58	.60	.63	.66	.69	.72	.76	.79	.83	.87	**64.4**
65.4	.45	.48	.50	.52	.55	.58	.60	.63	.66	.69	.72	.76	.79	.83	**65.4**
66.4	.44	.46	.48	.50	.52	.55	.58	.60	.63	.66	.69	.72	.76	.79	**66.4**
67.4	.42	.44	.46	.48	.50	.52	.55	.58	.60	.63	.66	.69	.72	.76	**67.4**
68.3	.40	.42	.44	.46	.48	.50	.52	.55	.58	.60	.63	.66	.69	.72	**68.3**
69.2	.38	.40	.42	.44	.46	.48	.50	.52	.55	.58	.60	.63	.66	.69	**69.2**
70.0	.36	.38	.40	.42	.44	.46	.48	.50	.52	.55	.58	.60	.63	.66	**70.0**
70.9	.35	.36	.38	.40	.42	.44	.46	.48	.50	.52	.55	.58	.60	.63	**70.9**
71.7	.33	.35	.36	.38	.40	.42	.44	.46	.48	.50	.52	.55	.58	.60	**71.7**
72.5	.32	.33	.35	.36	.38	.40	.42	.44	.46	.48	.50	.52	.55	.58	**72.5**
73.2	.30	.32	.33	.35	.36	.38	.40	.42	.44	.46	.48	.50	.52	.55	**73.2**
73.9	.29	.30	.32	.33	.35	.36	.38	.40	.42	.44	.46	.48	.50	.52	**73.9**
74.6	.28	.29	.30	.32	.33	.35	.36	.38	.40	.42	.44	.46	.48	.50	**74.6**
75.3	.26	.28	.29	.30	.32	.33	.35	.36	.38	.40	.42	.44	.46	.48	**75.3**
75.9	.25	.26	.28	.29	.30	.32	.33	.35	.36	.38	.40	.42	.44	.46	**75.9**
76.5	.24	.25	.26	.28	.29	.30	.32	.33	.35	.36	.38	.40	.42	.44	**76.5**
77.1	.23	.24	.25	.26	.28	.29	.30	.32	.33	.35	.36	.38	.40	.42	**77.1**
77.7	.22	.23	.24	.25	.26	.28	.29	.30	.32	.33	.35	.36	.38	.40	**77.7**
78.2	.21	.22	.23	.24	.25	.26	.28	.29	.30	.32	.33	.35	.36	.38	**78.2**
78.7	.20	.21	.22	.23	.24	.25	.26	.28	.29	.30	.32	.33	.35	.36	**78.7**
79.2	.19	.20	.21	.22	.23	.24	.25	.26	.28	.29	.30	.32	.33	.35	**79.2**
79.7	.18	.19	.20	.21	.22	.23	.24	.25	.26	.28	.29	.30	.32	.33	**79.7**
80.1	.17	.18	.19	.20	.21	.22	.23	.24	.25	.26	.28	.29	.30	.32	**80.1**
80.6	.17	.17	.18	.19	.20	.21	.22	.23	.24	.25	.26	.28	.29	.30	**80.6**
81.0	.16	.17	.17	.18	.19	.20	.21	.22	.23	.24	.25	.26	.28	.29	**81.0**
82.0	.14	.14	.15	.16	.17	.17	.18	.19	.20	.21	.22	.23	.24	.25	**82.0**
83.0	.12	.12	.13	.14	.14	.15	.16	.17	.17	.18	.19	.20	.21	.22	**83.0**
84.0	.10	.11	.11	.12	.13	.13	.14	.14	.15	.16	.17	.17	.18	.19	**84.0**
85.0	.09	.09	.09	.10	.10	.11	.11	.12	.13	.13	.14	.14	.15	.16	**85.0**
86.0	.07	.07	.08	.08	.08	.09	.09	.09	.10	.10	.11	.11	.12	.13	**86.0**
87.0	.05	.05	.06	.06	.06	.07	.07	.08	.08	.08	.09	.09	.09	.10	**87.0**
88.0	.03	.04	.04	.04	.04	.04	.05	.05	.05	.05	.05	.06	.06	.06	**88.0**
89.0	.02	.02	.02	.02	.02	.02	.02	.02	.03	.03	.03	.03	.03	.03	**89.0**
	0°	**17°.3**	**24°.4**	**29°.4**	**33°.7**	**37°.4**	**40°.7**	**43°.6**	**46°.2**	**48°.6**	**50°.9**	**52°.9**	**54°.9**	**56°.7**	

Corr. to Long.= Error in Lat.×F.

TABLE 47.

Longitude Factors.

F is the Correction (in Minutes) to Long., due to each Mile of Error in Lat.

	Latitude.						Latitude.				
Az.	**58°.3**	**59°.9**	**61°.4**	**62°.8**	**64°.1**	Az.	**58°.3**	**59°.9**	**61°.4**	**62°.8**	**64°.1**
1°.0	110	115	120	126	132	**45°.0**	1.91	2.00	2.09	2.19	2.29
2.0	55	58	60	63	66	**46.3**	1.82	1.91	2.00	2.09	2.19
3.0	36	38	40	42	44	**47.6**	1.74	1.82	1.91	2.00	2.09
4.0	28	29	30	32	33	**48.9**	1.66	1.74	1.82	1.91	2.00
5.0	22	23	24	25	26	**50.2**	1.58	1.66	1.74	1.82	1.91
6.0	18	19	20	21	22	**51.5**	1.51	1.58	1.66	1.74	1.82
7.0	16	17	17	18	19	**52.8**	1.45	1.51	1.58	1.66	1.74
8.0	14	14	15	16	17	**54.1**	1.38	1.45	1.51	1.58	1.66
9.0	12	13	13	14	14	**55.3**	1.32	1.38	1.45	1.51	1.58
9.4	11.5	12.0	12.6	13.2	13.8	**56.5**	1.26	1.32	1.38	1.45	1.51
9.9	11.0	11.5	12.0	12.6	13.2	**57.7**	1.20	1.26	1.32	1.38	1.45
10.3	10.5	11.0	11.5	12.0	12.6	**58.9**	1.15	1.20	1.26	1.32	1.38
10.8	10.0	10.5	11.0	11.5	12.0	**60.1**	1.10	1.15	1.20	1.26	1.32
11.3	9.55	10.0	10.5	11.0	11.5	**61.2**	1.05	1.10	1.15	1.20	1.26
11.8	9.12	9.55	10.0	10.5	11.0	**62.3**	1.00	1.05	1.10	1.15	1.20
12.3	8.71	9.12	9.55	10.0	10.5	**63.4**	.95	1.00	1.05	1.10	1.15
12.9	8.32	8.71	9.12	9.55	10.0	**64.4**	.91	.95	1.00	1.05	1.10
13.5	7.95	8.32	8.71	9.12	9.55	**65.4**	.87	.91	.95	1.00	1.05
14.1	7.59	7.95	8.32	8.71	9.12	**66.4**	.83	.87	.91	.95	1.00
14.7	7.24	7.59	7.95	8.32	8.71	**67.4**	.79	.83	.87	.91	.95
15.4	6.92	7.24	7.59	7.95	8.32	**68.3**	.76	.79	.83	.87	.91
16.1	6.61	6.92	7.24	7.59	7.95	**69.2**	.72	.76	.79	.83	.87
16.8	6.31	6.61	6.92	7.24	7.59	**70.0**	.69	.72	.76	.79	.83
17.5	6.03	6.31	6.61	6.92	7.24	**70.9**	.66	.69	.72	.76	.79
18.3	5.75	6.03	6.31	6.61	6.92	**71.7**	.63	.66	.69	.72	.76
19.1	5.50	5.75	6.03	6.31	6.61	**72.5**	.60	.63	.66	.69	.72
20.0	5.25	5.50	5.75	6.03	6.31	**73.2**	.58	.60	.63	.66	.69
20.8	5.01	5.25	5.50	5.75	6.03	**73.9**	.55	.58	.60	.63	.66
21.7	4.79	5.01	5.25	5.50	5.75	**74.6**	.52	.55	.58	.60	.63
22.6	4.57	4.79	5.01	5.25	5.50	**75.3**	.50	.52	.55	.58	.60
23.6	4.37	4.57	4.79	5.01	5.25	**75.9**	.48	.50	.52	.55	.58
24.5	4.17	4.37	4.57	4.79	5.01	**76.5**	.46	.48	.50	.52	.55
25.6	3.98	4.17	4.37	4.57	4.79	**77.1**	.44	.46	.48	.50	.52
26.6	3.80	3.98	4.17	4.37	4.57	**77.7**	.42	.44	.46	.48	.50
27.7	3.63	3.80	3.98	4.17	4.37	**78.2**	.40	.42	.44	.46	.48
28.8	3.47	3.63	3.80	3.98	4.17	**78.7**	.38	.40	.42	.44	.46
29.9	3.31	3.47	3.63	3.80	3.98	**79.2**	.36	.38	.40	.42	.44
31.1	3.16	3.31	3.47	3.63	3.80	**79.7**	.35	.36	.38	.40	.42
32.2	3.02	3.16	3.31	3.47	3.63	**80.1**	.33	.35	.36	.38	.40
33.5	2.88	3.02	3.16	3.31	3.47	**80.6**	.32	.33	.35	.36	.38
34.7	2.75	2.88	3.02	3.16	3.31	**81.0**	.30	.32	.33	.35	.36
35.9	2.63	2.75	2.88	3.02	3.16	**82.0**	.26	.28	.29	.30	.35
37.2	2.51	2.63	2.75	2.88	3.02	**83.0**	.23	.24	.25	.26	.28
38.5	2.40	2.51	2.63	2.75	2.88	**84.0**	.20	.21	.22	.23	.24
39.8	2.29	2.40	2.51	2.63	2.75	**85.0**	.17	.17	.18	.19	.20
41.1	2.19	2.29	2.40	2.51	2.63	**86.0**	.13	.14	.14	.15	.16
42.4	2.09	2.19	2.29	2.40	2.51	**87.0**	.10	.11	.11	.12	.13
43.7	2.00	2.09	2.19	2.29	2.40	**88.0**	.07	.07	.08	.08	.08
45.0	1.91	2.00	2.09	2.19	2.29	**89.0**	.03	.03	.04	.04	.04
	58°.3	**59°.9**	**61°.4**	**62°.8**	**64°.1**		**58°.3**	**59°.9**	**61°.4**	**62°.8**	**64°.1**

Corr. to Long.= Error in Lat.×**F.**

TABLE 48.

Latitude Factors.

F is the Correction (in Miles) to Lat., due to each Minute of Error in Long.

	Latitude.								Latitude.						
Az.	**0°**	**17°.3**	**24°.4**	**29°.4**	**33°.7**	**37°.4**	**40°.7**	**Az.**	**0°**	**17°.3**	**24°.4**	**29°.4**	**33°.7**	**37°.4**	**40°.7**
1°.0	.02	.02	.02	.01	.01	.01	.01	**45°.0**	1.00	.95	.91	.87	.83	.79	.76
2.0	.03	.03	.03	.03	.03	.03	.03	**46.3**	1.05	1.00	.95	.91	.87	.83	.79
3.0	.05	.05	.05	.05	.04	.04	.04	**47.6**	1.10	1.05	1.00	.95	.91	.87	.83
4.0	.07	.07	.06	.06	.06	.06	.05	**48.9**	1.15	1.10	1.05	1.00	.95	.91	.87
5.0	.09	.08	.08	.08	.07	.07	.07	**50.2**	1.20	1.15	1.10	1.05	1.00	.95	.91
6.0	.11	.10	.10	.09	.09	.08	.08	**51.5**	1.26	1.20	1.15	1.10	1.05	1.00	.95
7.0	.12	.12	.11	.11	.10	.10	.09	**52.8**	1.32	1.26	1.20	1.15	1.10	1.05	1.00
8.0	.14	.13	.13	.12	.12	.11	.11	**54.1**	1.38	1.32	1.26	1.20	1.15	1.10	1.05
9.0	.16	.15	.14	.14	.13	.13	.12	**55.3**	1.45	1.38	1.32	1.26	1.20	1.15	1.10
9.4	.17	.16	.15	.14	.14	.13	.13	**56.5**	1.51	1.45	1.38	1.32	1.26	1.20	1.15
9.9	.17	.17	.16	.15	.14	.14	.13	**57.7**	1.58	1.51	1.45	1.38	1.32	1.26	1.20
10.3	.18	.17	.17	.16	.15	.14	.14	**58.9**	1.66	1.58	1.51	1.45	1.38	1.32	1.26
10.8	.19	.18	.17	.17	.16	.15	.14	**60.1**	1.74	1.66	1.58	1.51	1.45	1.38	1.32
11.3	.20	.19	.18	.17	.17	.16	.15	**61.2**	1.82	1.74	1.66	1.58	1.51	1.45	1.38
11.8	.21	.20	.19	.18	.17	.17	.16	**62.3**	1.91	1.82	1.74	1.66	1.58	1.51	1.45
12.3	.22	.21	.20	.19	.18	.17	.17	**63.4**	2.00	1.91	1.82	1.74	1.66	1.58	1.51
12.9	.23	.22	.21	.20	.19	.18	.17	**64.4**	2.09	2.00	1.91	1.82	1.74	1.66	1.58
13.5	.24	.23	.22	.21	.20	.19	.18	**65.4**	2.19	2.09	2.00	1.91	1.82	1.74	1.66
14.1	.25	.24	.23	.22	.21	.20	.19	**66.4**	2.29	2.19	2.09	2.00	1.91	1.82	1.74
14.7	.26	.25	.24	.23	.22	.21	.20	**67.4**	2.40	2.29	2.19	2.09	2.00	1.91	1.82
15.4	.28	.26	.25	.24	.23	.22	.21	**68.3**	2.51	2.40	2.29	2.19	2.09	2.00	1.91
16.1	.29	.28	.26	.25	.24	.23	.22	**69.2**	2.63	2.51	2.40	2.29	2.19	2.09	2.00
16.8	.30	.29	.28	.26	.25	.24	.23	**70.0**	2.75	2.63	2.51	2.40	2.29	2.19	2.09
17.5	.32	.30	.29	.28	.26	.25	.24	**70.9**	2.88	2.75	2.63	2.51	2.40	2.29	2.19
18.3	.33	.32	.30	.29	.28	.26	.25	**71.7**	3.02	2.88	2.75	2.63	2.51	2.40	2.29
19.1	.34	.33	.32	.30	.29	.28	.26	**72.5**	3.16	3.02	2.88	2.75	2.63	2.51	2.40
20.0	.36	.34	.33	.32	.30	.29	.28	**73.2**	3.31	3.16	3.02	2.88	2.75	2.63	2.51
20.8	.38	.36	.34	.33	.32	.30	.29	**73.9**	3.47	3.31	3.16	3.02	2.88	2.75	2.63
21.7	.40	.38	.36	.34	.33	.32	.30	**74.6**	3.63	3.47	3.31	3.16	3.02	2.88	2.75
22.6	.42	.40	.38	.36	.34	.33	.32	**75.3**	3.80	3.63	3.47	3.31	3.16	3.02	2.88
23.6	.44	.42	.40	.38	.36	.34	.33	**75.9**	3.98	3.80	3.63	3.47	3.31	3.16	3.02
24.6	.46	.44	.42	.40	.38	.36	.34	**76.5**	4.17	3.98	3.80	3.63	3.47	3.31	3.16
25.6	.48	.46	.44	.42	.40	.38	.36	**77.1**	4.37	4.17	3.98	3.80	3.63	3.47	3.31
26.6	.50	.48	.46	.44	.42	.40	.38	**77.7**	4.57	4.37	4.17	3.98	3.80	3.63	3.47
27.7	.52	.50	.48	.46	.44	.42	.40	**78.2**	4.79	4.57	4.37	4.17	3.98	3.80	3.63
28.8	.55	.52	.50	.48	.46	.44	.42	**78.7**	5.01	4.79	4.57	4.37	4.17	3.98	3.80
29.9	.58	.55	.52	.50	.48	.46	.44	**79.2**	5.25	5.01	4.79	4.57	4.37	4.17	3.98
31.1	.60	.58	.55	.52	.50	.48	.46	**79.7**	5.50	5.25	5.01	4.79	4.57	4.37	4.17
32.2	.63	.60	.58	.55	.52	.50	.48	**80.1**	5.75	5.50	5.25	5.01	4.79	4.57	4.37
33.5	.66	.63	.60	.58	.55	.52	.50	**81.0**	6.3	6.0	5.8	5.5	5.2	5.0	4.8
34.7	.69	.66	.63	.60	.58	.55	.52	**82.0**	7.2	6.9	6.6	6.3	6.0	5.8	5.5
35.9	.72	.69	.66	.63	.60	.58	.55	**83.0**	8.3	7.9	7.6	7.2	6.9	6.6	6.3
37.2	.76	.72	.69	.66	.63	.60	.58	**84.0**	9.5	9.1	8.7	8.3	7.9	7.6	7.2
38.5	.79	.76	.72	.69	.66	.63	.60	**85.0**	11	11	10	10	9.5	9.1	8.7
39.8	.83	.79	.76	.72	.69	.66	.63	**86.0**	14	14	13	12	12	11	11
41.1	.87	.83	.79	.76	.72	.69	.66	**87.0**	19	18	17	17	16	15	14
42.4	.91	.87	.83	.79	.76	.72	.69	**88.0**	29	27	26	25	24	23	22
43.7	.95	.91	.87	.83	.79	.76	.72	**89.0**	57	55	52	50	48	46	43
45.0	1.00	.95	.91	.87	.83	.79	.76								
	0°	**17°.3**	**24°.4**	**29°.4**	**33°.7**	**37°.4**	**40°.7**		**0°**	**17°.3**	**24°.4**	**29°.4**	**33°.7**	**37°.4**	**40°.7**

Corr. to Lat. = Error in Long. × **F.**

TABLE 48.

Latitude Factors.

F is the Correction (in Miles) to Lat., due to each Minute of Error in Long.

	Latitude.								Latitude.						
Az.	43°.6	46°.2	48°.6	50°.9	52°.9	54°.9	56°.7	Az.	43°.6	46°.2	48°.6	50°.9	52°.9	54°.9	56°.7
1°.0	.01	.01	.01	.01	.01	.01	.01	**45°.0**	.72	.69	.66	.63	.60	.58	.55
2.0	.03	.02	.02	.02	.02	.02	.02	**46.3**	.76	.72	.69	.66	.63	.60	.58
3.0	.04	.04	.03	.03	.03	.03	.03	**47.6**	.79	.76	.72	.69	.66	.63	.60
4.0	.05	.05	.05	.04	.04	.04	.04	**48.9**	.83	.79	.76	.72	.69	.66	.63
5.0	.06	.06	.06	.06	.05	.05	.05	**50.2**	.87	.83	.79	.76	.72	.69	.66
6.0	.08	.07	.07	.07	.06	.06	.06	**51.5**	.91	.87	.83	.79	.76	.72	.69
7.0	.09	.08	.08	.08	.07	.07	.07	**52.8**	.95	.91	.87	.83	.79	.76	.72
8.0	.10	.10	.09	.09	.08	.08	.08	**54.1**	1.00	.95	.91	.87	.83	.79	.76
9.0	.11	.11	.10	.10	.09	.09	.09	**55.3**	1.05	1.00	.95	.91	.87	.83	.79
9.4	.12	.11	.11	.10	.10	.09	.09	**56.5**	1.10	1.05	1.00	.95	.91	.87	.83
9.9	.13	.12	.11	.11	.10	.10	.09	**57.7**	1.15	1.10	1.05	1.00	.95	.91	.87
10.3	.13	.13	.12	.11	.11	.10	.10	**58.9**	1.20	1.15	1.10	1.05	1.00	.95	.91
10.8	.14	.13	.13	.12	.11	.11	.10	**60.1**	1.26	1.20	1.15	1.10	1.05	1.00	.95
11.3	.14	.14	.13	.13	.12	.11	.11	**61.2**	1.32	1.26	1.20	1.15	1.10	1.05	1.00
11.8	.15	.14	.14	.13	.13	.12	.11	**62.3**	1.38	1.32	1.26	1.20	1.15	1.10	1.05
12.3	.16	.15	.14	.14	.13	.13	.12	**63.4**	1.45	1.38	1.32	1.26	1.20	1.15	1.10
12.9	.17	.16	.15	.14	.14	.13	.13	**64.4**	1.51	1.45	1.38	1.32	1.26	1.20	1.15
13.5	.17	.17	.16	.15	.14	.14	.13	**65.4**	1.58	1.51	1.45	1.38	1.32	1.26	1.20
14.1	.18	.17	.17	.16	.15	.14	.14	**66.4**	1.66	1.58	1.51	1.45	1.38	1.32	1.26
14.7	.19	.18	.17	.17	.16	.15	.14	**67.4**	1.74	1.66	1.58	1.51	1.45	1.38	1.32
15.4	.20	.19	.18	.17	.17	.16	.15	**68.3**	1.82	1.74	1.66	1.58	1.51	1.45	1.38
16.1	.21	.20	.19	.18	.17	.17	.16	**69.2**	1.91	1.82	1.74	1.66	1.58	1.51	1.45
16.8	.22	.21	.20	.19	.18	.17	.17	**70.0**	2.00	1.91	1.82	1.74	1.66	1.58	1.51
17.5	.23	.22	.21	.20	.19	.18	.17	**70.9**	2.09	2.00	1.91	1.82	1.74	1.66	1.58
18.3	.24	.23	.22	.21	.20	.19	.18	**71.7**	2.19	2.09	2.00	1.91	1.82	1.74	1.66
19.1	.25	.24	.23	.22	.21	.20	.19	**72.5**	2.29	2.19	2.09	2.00	1.91	1.82	1.74
20.0	.26	.25	.24	.23	.22	.21	.20	**73.2**	2.40	2.29	2.19	2.09	2.00	1.91	1.82
20.8	.28	.26	.25	.24	.23	.22	.21	**73.9**	2.51	2.40	2.29	2.19	2.09	2.00	1.91
21.7	.29	.28	.26	.25	.24	.23	.22	**74.6**	2.63	2.51	2.40	2.29	2.19	2.09	2.00
22.6	.30	.29	.28	.26	.25	.24	.23	**75.3**	2.75	2.63	2.51	2.40	2.29	2.19	2.09
23.6	.32	.30	.29	.28	.26	.25	.24	**75.9**	2.88	2.75	2.63	2.51	2.40	2.29	2.19
24.6	.33	.32	.30	.29	.28	.26	.25	**76.5**	3.02	2.88	2.75	2.63	2.51	2.40	2.29
25.6	.34	.33	.32	.30	.29	.28	.26	**77.1**	3.16	3.02	2.88	2.75	2.63	2.51	2.40
26.6	.36	.34	.33	.32	.30	.29	.28	**77.7**	3.31	3.16	3.02	2.88	2.75	2.63	2.51
27.7	.38	.36	.34	.33	.32	.30	.29	**78.2**	3.47	3.31	3.16	3.02	2.88	2.75	2.63
28.8	.40	.38	.36	.34	.33	.32	.30	**78.7**	3.63	3.47	3.31	3.16	3.02	2.88	2.75
29.9	.42	.40	.38	.36	.34	.33	.32	**79.2**	3.80	3.63	3.47	3.31	3.16	3.02	2.88
31.1	.44	.42	.40	.38	.36	.34	.33	**79.7**	3.98	3.80	3.63	3.47	3.31	3.16	3.02
32.2	.46	.44	.42	.40	.38	.36	.34	**80.1**	4.17	3.98	3.80	3.63	3.47	3.31	3.16
33.5	.48	.46	.44	.42	.40	.38	.36	**81.0**	4.6	4.4	4.2	4.0	3.8	3.6	3.5
34.7	.50	.48	.46	.44	.42	.40	.38	**82.0**	5.2	5.0	4.8	4.6	4.4	4.2	4.0
35.9	.52	.50	.48	.46	.44	.42	.40	**83.0**	6.0	5.8	5.5	5.2	5.0	4.8	4.6
37.2	.55	.52	.50	.48	.46	.44	.42	**84.0**	6.9	6.6	6.3	6.0	5.8	5.5	5.2
38.5	.58	.55	.52	.50	.48	.46	.44	**85.0**	8.3	7.9	7.6	7.2	6.9	6.6	6.3
39.8	.60	.58	.55	.52	.50	.48	.46	**86.0**	11	10	9.9	9.4	9.0	8.6	8.2
41.1	.63	.60	.58	.55	.52	.50	.48	**87.0**	14	13	13	12	11	11	10
42.4	.66	.63	.60	.58	.55	.52	.50	**88.0**	21	20	19	18	17	16	16
43.7	.69	.66	.63	.60	.58	.55	.52	**89.0**	41	40	38	36	35	33	31
45.0	.72	.69	.66	.63	.60	.58	.55								
	43°.6	46°.2	48°.6	50°.9	52°.9	54°.9	56°.7		43°.6	46°.2	48°.6	50°.9	52°.9	54°.9	56°.7

Corr. to Lat.= Error in Long.×F.

TABLE 48.

Latitude Factors.

F is the Correction (in Miles) to Lat., due to each Minute of Error in Long.

	Latitude.						Latitude.				
Az.	**58°.3**	**59°.9**	**61°.4**	**62°.8**	**64°.1**	**Az.**	**58°.3**	**59°.9**	**61°.4**	**62°.8**	**64°.1**
1°.0	.01	.01	.01	.01	.01	**45.0**	.52	.50	.48	.46	.44
2.0	.02	.02	.02	.02	.02	**46.3**	.55	.52	.50	.48	.46
3.0	.03	.03	.03	.03	.02	**47.6**	.58	.55	.52	.50	.48
4.0	.04	.04	.03	.03	.03	**48.9**	.60	.58	.55	.52	.50
5.0	.05	.04	.04	.04	.04	**50.2**	.63	.60	.58	.55	.52
6.0	.06	.05	.05	.05	.05	**51.5**	.66	.63	.60	.58	.55
7.0	.06	.06	.06	.06	.05	**52.8**	.69	.66	.63	.60	.58
8.0	.07	.07	.07	.06	.06	**54.1**	.72	.69	.66	.63	.60
9.0	.08	.08	.08	.07	.07	**55.3**	.76	.72	.69	.66	.63
9.4	.09	.08	.08	.08	.07	**56.5**	.79	.76	.72	.69	.66
9.9	.09	.09	.08	.08	.08	**57.7**	.83	.79	.76	.72	.69
10.3	.09	.09	.09	.08	.08	**58.9**	.87	.83	.79	.76	.72
10.8	.10	.09	.09	.09	.08	**60.1**	.91	.87	.83	.79	.76
11.3	.10	.10	.09	.09	.09	**61.2**	.95	.91	.87	.83	.79
11.8	.11	.10	.10	.09	.09	**62.3**	1.00	.95	.91	.87	.83
12.3	.11	.11	.10	.10	.09	**63.4**	1.05	1.00	.95	.91	.87
12.9	.12	.11	.11	.10	.10	**64.4**	1.10	1.05	1.00	.95	.91
13.5	.13	.12	.11	.11	.10	**65.4**	1.15	1.10	1.05	1.00	.95
14.1	.13	.13	.12	.11	.11	**66.4**	1.20	1.15	1.10	1.05	1.00
14.7	.14	.13	.13	.12	.11	**67.4**	1.26	1.20	1.15	1.10	1.05
15.4	.14	.14	.13	.13	.12	**68.3**	1.32	1.26	1.20	1.15	1.10
16.1	.15	.14	.14	.13	.13	**69.2**	1.38	1.32	1.26	1.20	1.15
16.8	.16	.15	.14	.14	.13	**70.0**	1.45	1.38	1.32	1.26	1.20
17.5	.17	.16	.15	.14	.14	**70.9**	1.51	1.45	1.38	1.32	1.26
18.3	.17	.17	.16	.15	.14	**71.7**	1.58	1.51	1.45	1.38	1.32
19.1	.18	.17	.17	.16	.15	**72.5**	1.66	1.58	1.51	1.45	1.38
20.0	.19	.18	.17	.17	.16	**73.2**	1.74	1.66	1.58	1.51	1.45
20.8	.20	.19	.18	.17	.17	**73.9**	1.82	1.74	1.66	1.58	1.51
21.7	.21	.20	.19	.18	.17	**74.6**	1.91	1.82	1.74	1.66	1.58
22.6	.22	.21	.20	.19	.18	**75.3**	2.00	1.91	1.82	1.74	1.66
23.6	.23	.22	.21	.20	.19	**75.9**	2.09	2.00	1.91	1.82	1.74
24.6	.24	.23	.22	.21	.20	**76.5**	2.19	2.09	2.00	1.91	1.82
25.6	.25	.24	.23	.22	.21	**77.1**	2.29	2.19	2.09	2.00	1.91
26.6	.26	.25	.24	.23	.22	**77.7**	2.40	2.29	2.19	2.09	2.00
27.7	.28	.26	.25	.24	.23	**78.2**	2.51	2.40	2.29	2.19	2.09
28.8	.29	.28	.26	.25	.24	**78.7**	2.63	2.51	2.40	2.29	2.19
29.9	.30	.29	.28	.26	.25	**79.2**	2.75	2.63	2.51	2.40	2.29
31.1	.32	.30	.29	.28	.26	**79.7**	2.88	2.75	2.63	2.51	2.40
32.2	.33	.32	.30	.29	.28	**80.1**	3.02	2.88	2.75	2.63	2.51
33.5	.34	.33	.32	.30	.29	**81.0**	3.3	3.2	3.0	2.9	2.8
34.7	.36	.34	.33	.32	.30	**82.0**	3.8	3.6	3.5	3.3	3.2
35.9	.38	.36	.34	.33	.32	**83.0**	4.4	4.2	4.0	3.8	3.6
37.2	.40	.38	.36	.34	.33	**84.0**	5.0	4.8	4.6	4.4	4.2
38.5	.42	.40	.38	.36	.34	**85.0**	6.0	5.7	5.5	5.2	5.0
39.8	.44	.42	.40	.38	.36	**86.0**	7.9	7.5	7.2	6.8	6.5
41.1	.46	.44	.42	.40	.38	**87.0**	10	9.6	9.1	8.7	8.3
42.4	.48	.46	.44	.42	.40	**88.0**	15	14	14	13	12
43.7	.50	.48	.46	.44	.42	**89.0**	30	29	27	26	25
45.0	.52	.50	.48	.46	.44						
	58°.3	**59°.9**	**61°.4**	**62°.8**	**64°.1**		**58°.3**	**59°.9**	**61°.4**	**62°.8**	**64°.1**

Corr. to Lat.= Error in Long.×**F.**

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